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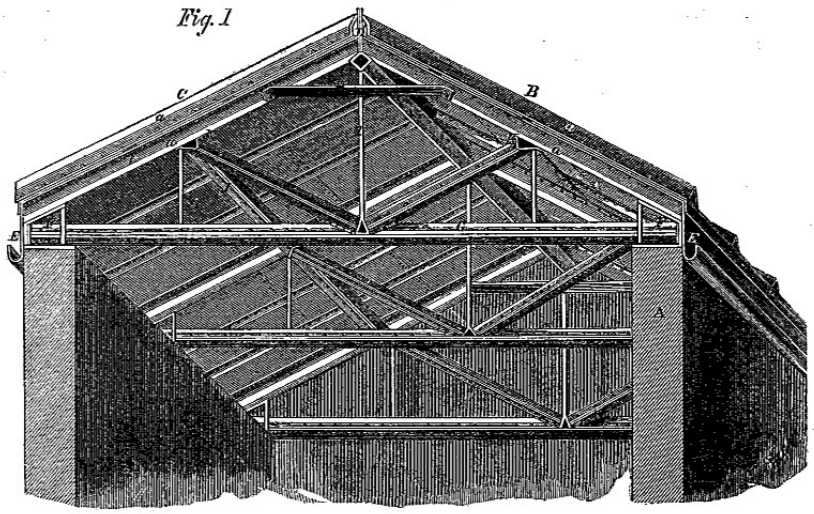
Metallic Roofing.

In constructing metallic roofs there is no difficulty in making those joints tight that are parallel with the eaves, as by lapping the upper plate over the lower the water is sure to be carried off; but the whole trouble has been with the joints that extend from the ridge to the eaves, and which are very liable to leak. We here illustate a plan by which these transverse joints are made perfectly and surely tight. It consists in making the rafters each of two plates of iron bent into the form of V-shaped troughs, one of which is directly beneath the joint and catches any drops that may leak through.

The construction of the rafter is shown in cross-section in Fig. 3, and its relation to the side plates in Fig. 4. Each section, *a a*, of the rafter has a flange, *b*, upon its edge, and between these flanges the roof plate, D, is secured by the bolt, *e*. The edges of the plate, D, are bent up at *c*, thus forming a trough of the plate, while if any water or snow should beat through, it will be caught in the lower section of the rafter and conducted down into the eave trough.

Fig. 1



REED'S METALLIC ROOF.

Fig. 1 is a perspective view of the roof from the lower side, and Fig. 2 is a longitudinal section. The rafters empty into the eave troughs, E, and the stringers, G, the collar beams, H, and braces, K, are all made of iron in the same manner as the rafters. When the rafters are very long they may be supported by a longitudinal beam, J, and the stringers may be sustained in the middle by the king post, J.

The inventor states that there is a roof at Chelsea, constructed on this plan, 56×20 feet, which pitches only one foot in 20, that has been on over two years and that has never leaked one drop either with rain or snow.

The patent for this invention was granted, through the Scientific American Patent Agency, March 26, 1861, and further information in relation to it may be obtained by addressing the inventor, Wm. G. Reed, at Chelsea, Mass.

USES OF WOOLEN RAGS.

To prepare "shoddy" for the purpose of using it in the manufacture of cloth, worn out woolen garments, and tailors' clippings, are placed in a machine containing a number of revolving teeth by means of which they are torn into shreds. Oil is then sprinkled among them, and they are passed through another machine which reduces them to a still finer condition. This material called shoddy, is sold in England for about one-third the price of fresh wool, and it is employed in large quantities for making ladies' light cloths. It is also used extensively for mixing with wool in making ordinary woolen cloths. The coarser varieties of shoddy are mixed with coarse wools for making common English blankets and coarse cloth.

Fig. 2

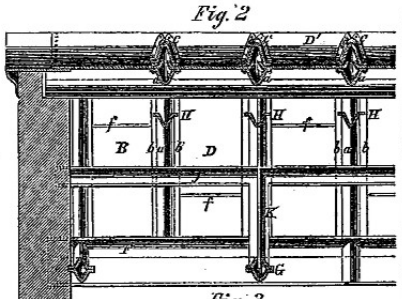


Fig. 3

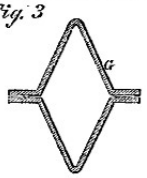
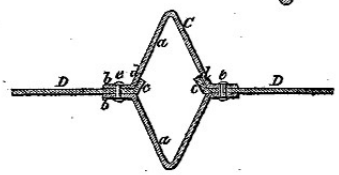


Fig. 4



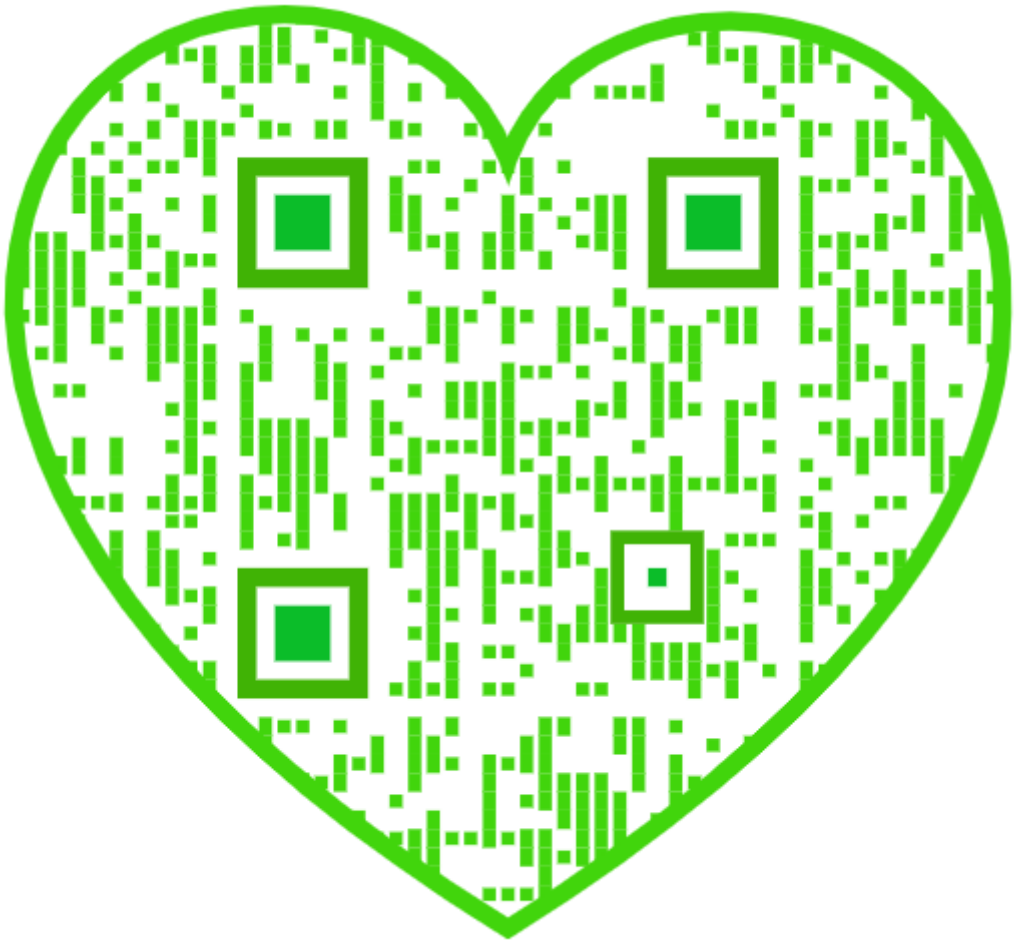
A portion of the rags thus cut up is reduced so very fine that it cannot be mixed with wool so as to be spun, still it has its uses—nothing is lost by the economical woolen manufacturers. This very fine stuff is called "mungo;" it is reduced to powder, or flocks, dyed various colors, and sold for covering wall paper, to give it the appearance of velvet. The paper is prepared by printing a paste upon it, suitable to the pattern desired, then the colored flock is dusted on with a sieve and adheres to the moist printed parts, thus forming velvet flowers.

Muslin delaines being composed of half wool and half cotton, were considered worthless as rags for quite a number of years, because the two substances could not be separated economically as they are totally different in their nature. The wool can be separated by boiling such rags in dilute sulphuric acid, which dissolves the cotton and converts it into dirty grape sugar; and the cotton can be separated by boiling the rags in a caustic alkaline solution which converts the wool into a dirty soap, but in either case the wool or cotton is lost by being changed into a useless substance. A discovery has lately been made in England by which the cotton of old muslin delaines is saved and the wool converted into useful manure. It consists in placing the rags in a close vessel and subjecting them for a few hours to the action of steam at 75 lbs. pressure on the inch. The steam converts the wool into a resinous-like substance, and it separates from the cotton, which remains as firm and strong as it was before. When the muslin delaine rags thus treated, are taken out of the steam chamber they are dried, then placed in large sieves and subjected to a beating operation, when what was formerly wool passes through the sieves in the form of powder, and the cotton remains behind. The latter may be used for making paper, or if bleached, it may be mixed with fresh cotton and made into cloth in the same manner that shoddy is employed. The gum produced from the wool contains 12 per cent of nitrogen and is used for manure, being sold under the name of "ulmate of ammonia."

Scientific Ballooning.

The balloon committee of the British Association for the Advancement of Science has made its first experiments in meteorological observations in the air. Mr. Glaisher, Superintendent of the Meteorological Department of the Royal Observatory, during an ascension with the æronaut Coxwell, reached an altitude of five miles, where he found the temperature 16°, with the air dry and the electricity positive. M. Godard, the French balloonist, who appeared in New York a few years ago, has made an ascension in a new balloon constructed by himself, at Montmartre, France, and narrowly escaped a fatal accident. The cord of the anchor, in unwinding too rapidly, became twisted round his thigh, and his companion was about to cut it, as the only manner of releasing him, when the people of the neighborhood caught the other cords of the balloon which were near the ground, and brought it safely to land.

According to a rain gage kept at Fort Gaston, Klamath county, California, by Dr. C. A. Kirkpatrick, the fall of rain at that point from September 16, 1861, to June 18, 1862, a period of nine months, reached the enormous amount of 129 inches and a fraction over! Only think of ten and three-quarters feet of rain in nine months.



NOTES ON MILITARY AND NAVAL AFFAIRS.

A MOVEMENT IN M'CLELLAN'S ARMY.

A reconnoiss ance in force under General Hooker has been pushed within ten miles of Richmond. The troops set forth about dark on the evening of Aug. 4, and arrived at Malvern Hill the next morning about 4 o'clock. Here they encountered two regiments of infantry and a battery posted behind earthworks. Fire was immediately opened on them by Captain Benson's battery and a section of Captain Robinson's. The infantry was not engaged. The firing lasted about three hours, when the rebels fled by the river road toward Richmond, hotly pursued by our troops, who succeeded in taking one hundred of them prisoners. The loss on our side at this point was three killed and eleven wounded. Captain Benson had his thigh broken by a piece of shell, and Lieutenant Colonel Gamble, of the Eighth Illinois cavalry, was severely wounded in the breast while driving in the enemy's pickets. General Averill, with 500 cavalry, took the Quaker road to White Oak Swamp Bridge. Here they found the Tenth Virginia cavalry drawn up to receive them. A charge was immediately ordered, which broke the rebel lines, when they fled. General Averill followed them three miles, taking twenty-eight prisoners, without losing a man. General Pleasanton, with a force of cavalry, took the New Market road, on which a portion of the rebels were retreating. He followed them to within a short distance of New Market, where, meeting two brigades of rebels, he fell back, bringing over thirty prisoners taken on the way. New Market is ten miles from Richmond.

Our forces fell back to Malvern Hill, where they encamped and remained till the 6th of August, when the enemy appearing in large force, General McClellan ordered General Hooker to withdraw his troops to Harrison's Landing, and the movement was quietly effected during the night.

MURDER OF GENERAL M'COOK.

On the 5th of August, General Robert McCook, who was at the time very sick, was in an ambulance near Salem, Alabama, on his way to his brigade. The ambulance was traveling over the usual military road, and, about ten o'clock in the morning, it arrived at a plantation where there was an abundance of water. After refreshing themselves they passed on with the wounded General. Intelligence of his whereabouts and condition was quickly spread, it is supposed, for before the ambulance had proceeded three miles, the driver discovered that he was pursued by guerillas. It was impossible to think of flight, and General McCook's condition prohibited any idea of rescuing him. The guerilla leader ordered the ambulance to stop, the assassins at the same time surrounding it. The vehicle was then upset and the sick officer turned into the road. While on his knees, helpless and sick, he was fired at by a ruffian, and shot through the side. The wound was fatal—General McCook surviving it but a few hours. He bore his suffering heroically and to the last manifested an undaunted spirit. His last words were, "Tell Aleck" (alluding to his brother, General Alexander McDowell McCook) "and the rest, that I have tried to live like a man and do my duty."

When the news of the murder became known among the camps, the excitement was intense. The Ninth Ohio, McCook's own regiment, on learning of the assassination marched back to the scene of the occurrence, burned every house in the neighborhood and laid waste the lands. Several men who were implicated in the murder, were taken out and hung to trees by the infuriated soldiery.

BATTLE OF CEDAR MOUNTAIN.

One of the fiercest battles of the war was fought on Saturday, August 9th, between a portion of General Banks's command, and a large army under the ablest of the rebel leaders, the famous "Stonewall" Jackson.

General Banks's corps forms a portion of General Pope's "Army of Virginia," which just before the battle was at Culpepper Court House, 98 miles by railroad, northwest from Richmond, and which was slowly making its way southward.

On Friday, the 8th of August, General Bayard, who was in the advance with six regiments of cavalry, dicovered the enemy in large force advancing to the encounter of our men. The cavalry slowly fell back, holding the enemy in check until nightfall, at which time they had retired to Spring Creek, about six miles south of Culpepper.

Spring Creek is a small rivulet running southeastwardly into the Rapidan river, and to the southwest of it are two other small branches of the Rapidan, Cedar Creek and Robinson's Creek, flowing in the same southeastwardly direction. Between these two creeks is a long low hill, crowned at its southeast end by a conical elevation, 800 feet in hight, called Cedar Mountain. This mountain is covered with oak woods, and upon its side the enemy had planted three batteries of artillery, while several other batteries, with heavy masses of infantry, were stationed in the woods beyond Robinson's Creek, the lines stretching forward across the creek upon the northwest end of the low hill.

At dark on Friday night, General Banks arrived at Culpepper Court House with his command, after a march of 8 miles from his camp at the north. He received orders to proceed southward to the attack of the enemy. General Banks, accordingly took up his march in the morning of Saturday, August 9th, a bright hot day, and passed General McDowell's division, which was encamped four miles south of Culpepper. In the afternoon, Crawford's brigade of General Williams's division, reached Spring Creek, the most easterly of the three little streams, and as they emerged from the woods on the easterly bank, they were startled by a fire from the enemy's batteries high up on the side of Cedar Mountain. They, however, marched onward under the fire across Cedar Creek, and took position to the north of Cedar Mountain, on the hill from which this mountain rises. Here Captain Best, of the regular artillery, stationed his battery of Parrott guns and opened in reply to the enemy. For half an hour the battle was confined to the almost incessant roar of the artillery, when the enemy began to emerge from the woods to the west and north of our troops. General Augur's division, with Knapp's battery, was then ordered to advance and occupy the northern portion of the hill, which they did at about half past five in the afternoon, and the fight became general.

One of the enemy's batteries proved so annoying that it was determined to attempt its capture, and a portion of the District of Columbia troops charged upon it with the bayonet, and succeeded in taking two guns with small loss to themselves. Three other bayonet charges were also made, but they were all repulsed by the superior numbers of the enemy's infantry. The artillery firing on both sides was terribly effective, and the battle was one of the bloodiest for the numbers engaged of any that has occurred during the war. The fight was continued with determined obstinacy on both sides till night, when our army fell back a short distance from their position, leaving the field in possession of the enemy.

All of our dead and many of our wounded lay upon the field through all of the hot sun of Sunday, and on Monday the dead were buried and the wounded were removed under the protection of a flag of truce.

One eyewitness, however, says that the enemy's forces retired from the field as well as our own, and that the next morning we took possession of the ground; furthermore, that the flag of truce requesting leave to bury the dead came from Jackson.

Had General Banks sent for reinforcements earlier he might have had the aid of Sigel's division as well as of McDowell's, but he underestimated the force of the enemy. All accounts, agree, however, in saying that he handled his troops with signal ability.

RETREAT OF JACKSON.

The following dispatch has been received at Washington:—

HEADQUARTERS, ARMY OF VIRGINIA,
Cedar Mountain, Va., August 12—7:30 A. M.

TO MAJOR-GENERAL HALLECK:—

The enemy has retreated under cover of the night. His rear guard are now crossing the Rapidan toward Orange Court House.

Our cavalry and artillery are in pursuit.

JOHN POPE, Major General.

GUERILLAS AT THE WEST.

Numerous bands of rebels are making what fight they can in Tennessee, Kentucky and Missouri. The most famous of all these predatory leaders, Morgan, has succeeded in getting safely out of Kentucky, and on the 12th of August he entered the town of Gallatin, Tennessee, capturing Col. Boone, with four companies of Union troops.

Gen. Negley has sent the following dispatch to the War Department:—

COLUMBIA, Tenn., August 12—9 A. M.

HON. E. M. STANTON, Secretary of War:—

Major Kennedy, with two small companies of the First Kentucky cavalry, encountered the guerrillas in greatly superior numbers six times yesterday and last night, at various points below Williamsport, defeating the enemy in each affair, with considerable loss. Our loss is only one wounded. J. S. NEGLEY, Brigadier General.

On the 11th of August, the town of Independence, Mo., was captured by a band of guerillas some 500 or 600 strong, and 50 or more of our troops were taken prisoners. They were afterward parolled.

REPORTED DESTRUCTION OF THE ARKANSAS.

The Richmond *Examiner* has the following:—

AMITE RIVER, August 6, 1862.

About one o'clock this morning the federal gunboats attacked the Confederate ram *Arkansas*. A messenger informs me that she fought them well for some time, inflicting great damage. She was then blown up by her crew. The messenger thinks they all escaped.

JOHN C. BRECKINRIDGE.

Iron Clads of the British Navy.

Mitchell's Steam Shipping Journal contains the following on the iron-clad navy of England:—

A return just issued, gives a statement of all iron-cased ships and floating batteries, building or afloat. The "iron-built" vessels in the course of construction, and which are to be partially cased, are—The *Achilles*, of 1,250-horse power; the *Agincourt*, 1,350; the *Minotaur*, 1,350; the *Northumberland*, 1,350; the *Hector*, 800; the *Valiant*, 800-horse power, is to be wholly cased. There are afloat, and "partially" cased—the *Black Prince*, of 1,250-horse power; the *Warrior*, 1,250; the *Defence*, 600; and the *Resistance*, 600-horse power. The floating batteries wholly cased are—the *Erebus*, the *Terror*, and the *Thunderbolt*, each of 200-horse power. The woodbuilt vessels in course of construction and to be wholly cased, are—the *Caledonian* and *Ocean*, each of 1,000-horse power. The *Royal Alfred* and *Royal Oak*, of 800 each; the *Favorite*, 400; and the *Enterprise*, 160-horse power, are to be partially cased. The *Royal Sovereign*, of 800-horse power, is to be wholly cased. There is afloat the *Prince Consort*, of 1,000-horse power; and the floating batteries are the *Ætna*, 200-horse power, and the *Glatton*, the *Thunder*, and the *Trusty*, each of 150-horse power. The *Royal Sovereign* is to be fitted with Coles's cupola. The estimated speed of the iron vessels building ranges from 14·3 to 11·4 knots an hour, and of the batteries about 5·5 knots per hour. The estimated speed of the wood-built vessels is from 12·4 to 9·50 knots.

With the floating batteries the entire number is twenty six. Four of them will be about 8,000 tuns burden and two of them about 6,500 tuns.

Baltimore and Ohio Railroad.

From the report just published, for May, of Thatcher Perkins, Esq., Master of Machinery, for the above named railroad, we learn that the number of locomotives employed in May, was 168 and the average number of miles run by each was 1841. The miles run to one cord of wood was 968, to one quart of oil 23·1, the pound of coal consumed per mile was 56, cost of repairs per mile run 6·3 cents, cost for fuel per mile 2·2 cents. The total number of miles run by all the engines for the month of May was 309,538. Situated on the border land this railroad has frequently suffered during the past year by having several of its bridges destroyed, its track injured, and its locomotives broken in pieces, yet amid all these disasters its affairs have been most ably managed, and its officers have displayed great energy, ability and perseverance.

Land Draining in England.

Drainage in England began with the great landlords, and they converted their tenants. Had the introduction of systematic draining been left to English tenant farmers, it would have taken twenty years to popularize it. The example and influence of aristocratic landlords, like the Earl of Lonsdale and the duke of Bedford, had a great effect; farmers' club debates and newspaper discussions did the rest, assisted by drainage engineers anxious to do business. During the depression that followed the repeal of the Corn Laws, many landlords drained the farms of the tenants instead of reducing their rent, and even paid them for the carriage of the tiles. In England, as a rule, the landlord drains, and the tenant pays interest on the work; or the landlord finds the pipes and the tenant lays them down.

Three New Iron-clads for the Mississippi.

The Missouri *Republican* gives a description of three powerful, impregnable iron-clad gunboats contracted for by the Government, for service on the Mississippi —the *Chilicothe*, *Indianola* and *Tuscumbia*, now building and nearly completed, the two former at Cincinnati and the latter at New Albany, Indiana, under a contract with Captain Joseph Brown, a St. Louisian. From this description we learn that the *Chilicothe* is nearly finished. She is the smallest of the three, built strongly, with side wheels working in a recess; is entirely iron-clad, sides, bow, deck and stern—her deck iron being 1-inch thick, and her hull plates 2-inch. Her tower is covered with 3-inch plates, carrying two guns of a hundred and sixty-eight pounds caliber. With all her armament on board, she will draw but thirty-four inches. In length, she is a hundred and sixty-two, with a width of fifty feet. Her officers' rooms and machinery are all below deck, and perfectly protected from shot. She has two steam capstans of great power, which in shoal water would be able to haul her over a bar with two feet water. She has made a trial trip, and easily makes five miles per hour up stream.

The *Indianola* is a larger boat, being one hundred and seventy by fifty feet, with a nine-foot hold. She is powerfully and heavy built, with side wheels, and, in addition, two propellers. She has five large boilers and four engines of great power, which will propel her without trouble ten miles per hour up stream. She also carries one hundred and sixty-eight-pound guns in a shot-proof tower covered with 3-inch iron; her hull in every part, bow, sides and stern, being protected with 2-inch iron, and her deck covered with 1-inch plates. In every respect she is a war vessel of formidable strength, and is designed for ease and speed in handling, as well as for the crushing power of her armament. Her machinery is all in, and within six weeks it is expected she will be ready for service.

The *Tuscumbia* is being built at New Albany, her size being such that she could not be carried through the canal. She is one hundred and seventy feet by seventy, with a seven-foot hold, and will carry 168-pound guns. She is in every way like the *Indianola*, only larger, having side wheels and propellers with immense engines, in size and power capable of taking her against the current ten miles per hour. Her draught will not exceed forty-nine inches. She will be completed within six weeks, and her proportions, strength and invincible power will be far in advance of anything now on the Western waters.

The machinery for these three formidable war vessels is being built in St. Louis, by McCord, who, together with L. P. Sanger has an interest in the contract. A large portion of the iron plates, and perhaps the whole, was contracted for with Harrison & Co., of St. Louis, and was rolled at their mill.

The towers are not, as in the *Monitor*, revolving, but stationary, with sloping sides and a ball-proof iron grating over head. The threev essels have a hot-water apparatus for the benefit of the enemy should he attempt to board during an engagement.

Iron Ships.

A correspondent of the Davenport *Independent* says:—The condition of our iron ships, as from time to time they are brought under examination, is a subject for our gravest consideration. It was but a short time since we directed attention to the state of the plates of the bottom of her Majesty's ship *Triton* now being repaired in Keyham yard, which were found to be so corroded by rust from the outside as to render it imperatively necessary to remove a large number of them. We have now an instance of the presence of the same insidious destroyer attacking an iron vessel on the inside, while externally she exhibited no symptom of decay. While the laborers in this yard, a few days since, were scraping the bottom of her Majesty's steamer *Princess Alice* (the Admiral's tender at this port), a month or two since, a tender to her Majesty's yacht, they found that in some places the scrapers went through the bottom, and on further examination it was discovered that the damage occurred to a considerable extent immediately under her cylinders, a part of the ship where, if the water had rushed through at sea, there would have been no means of stopping it, and the ship must have gone down. It was providential that the evil was detected in time. The shipwrights of the yard (and not boiler makers) are employed in making good the defects by means of iron plates.

California Industrial Statistics.

Great Flouring Mills.—The California *Farmer* says:—About one year ago we alluded to the splendid Granite Mills at Folsom of Coover & Stockton, and of the connection of the Bay State Mills Company with them. The mighty flood of December last swept away these immense solid granite mills with as much ease as if they were the playthings of children upon the side of a little stream, for the water rose one hundred feet, carrying away at the same time the great Wire Bridge, and all other bridges on the American river and its branches.

These united companies, however, do not allow ordinary, or in this case extraordinary, events to make them falter. Messrs. Coover & Stockton, and Messrs. J. H. Carroll & Co., with commendable zeal have nearly completed the new mills, with greater power and more safe foundations, and with guards. These mills will be completed in August. The loss of the mills and merchandise by the flood was from $55,000 to $60,000. Z. Amos, of Amos, Phinney & Co., of San Francisco, is the contractor in building, &c., the machinery is manufactured by Goss & Lambard of Sacramento. The following are the dimensions of the Granite Mills: 60 by 80, four stories above the basement, eight run of four feet burrs—six of them for flouring and two for cornmeal. The works are propelled by turbine wheels. The water power has been improved by widening and repairing the head race, which is now cut through solid rock. The power is largely in excess of anything the mill can use, and is by far the best water power in the country. Intended capacity of the flouring department is 350 barrels per day, but it could easily turn out 600 barrels with proper sharpening of all the burrs.

Aside from the great flouring capacity, two run of four-feet burrs, which have all the arrangements for manufacturing meal, grinding barley or custom work of any kind, are added to the mill.

The Bay State Mills at Sacramento, with their new arrangements and machinery, will turn out 125 barrels per day. Their work from July 1, 1861 to December 1, 1861, was about 20,000 barrels.

Manufacturing News.

Rifled muskets will soon be made at Colt's manufactory, at Hartford, Conn. An order for making 10,000 has been taken, the machinery is being put up and when completed, it is expected that 400 will be turned out daily.

A new cotton mill is in the course of erection at Killingly, Conn., in which 12,000 spindles will be run. The machinery is to be driven by a 140-horse power Jonval turbine, to be built by the Phœnix Iron Foundry, Providence, R. I.

The steam box mill of Haines & Wallace, in Manchester, N. H., which was burnt six or seven weeks since, has been rebuilt. The steam engine has been repaired, and new machinery has been put up. The planing mill has already started, and operations in the box manufactory have been resumed.

In Beverly, the Boston *Commercial Bulletin* says:—Messrs. Foster & Young have lately established a steam shoe factory, 90 feet by 25, three stories in hight, with an ample basement and the two prominent features are the introduction of machinery, so far as it can be made available, propelled by steam, and the division of labor.

The Crops in America and Europe.

The accounts from the West are cheering with the promises of a most abundant harvest. The wheat crop is excellent and so is hay in most places. Corn is also very promising although it was rather backward until within the past three weeks. It is expected that there will be a large surplus crop of wheat and corn. This will be of the utmost importance not only to ourselves but Europe, as there will be large demands for our grain and flour from both France and England. A British paper of July 12 says:—A general uneasiness now prevails regarding the season. It is now nearly the middle of July, and the thermometer has scarcely reached above 50°, when its range is usually 70°. Besides, rain has fallen almost daily, and on heavy soils the crops look stunted. In many cases oats are little more than brairded, and turnips are scarcely visible. In a few early fields this week hoers were at work, muffled up in their top coats, as if it had been the middle of winter. Never was dry weather and heat more urgently needed than at present.

Fires in New York City and Fire Engines.

The following interesting information is condensed from the Semi-Annual Report, ending 1st of June, 1862, just published, of the Fire Marshal, A. E. Baker:—

The number of steam fire-engines now in use by the fire companies of New York is fourteen. Three are in process of construction and five companies have made application to be supplied with them. From these facts it may now be assumed as established that steam fire-engines are superior to those worked by hand. Previous to the introduction of the steam fire-engine, great difficulty had always been experienced in checking the progress of a conflagration in lofty buildings. This difficulty was daily becoming greater, and the losses from fire increasing.

In my last report I devoted considerable space to a specification of the dangers resulting from the storage of crude earth oils within the fire limits of the city. The apprehensions which I then expressed have since received additional confirmation. Let me again request that no time should be lost by the Common Council, in the adoption of an ordnance by which this new danger should be removed from the crowded precincts of the city and confined to localities where the buildings in which these oils are stored should alone be endangered.

The recent act passed by the Legislature for the regulation and inspection of buildings, went into operation on the first of May last. I am glad to find that the selling or storing in tenement houses of hay, straw, hemp, flax, wood, shavings, burning-fluid, turpentine, camphene or any other combustible materials, except in such quantities as shall be permitted by ordnance of the Common Council, is prohibited under the new act.

During the past ha year twelve arrests were made on suspicion of arson; eleven were discharged by the magistrates, and one dismissed by the Grand Jury.

The aggregate fires for the six months, ending the 31st of May, was 183, being seven less than that of the corresponding six months of the previous year. The total alleged losses amount to $963,060, the insurances to $2,760,656, and the actual amounts paid by underwriters, to $765,869. Prominent among the causes of fires and alarms are the following:—

Stoves and stovepipes	25
Combustion and supposed combustion	5
Gas in windows, leakage of gas and window curtains.	21
Hot-air registers and furnaces	6
Grates, fireplaces and fireboards	9
Steam boilers	6
Sparks on roofs	11
Children playing with fire or lights	8
Defective chimney flues	10
Carelessness with lights, communicating fire to beds, bedding, &c	20
Ashes	5
Dripping fat in smoke-houses	5
Fluid and camphene lamp explosions	5
Intoxication	6
Matches	6
Furnaces	8

Deaths by fire,	Men.	Women.	Boys.	Girls.
Fluid lamps	0	1	0	1
From candles	0	1	1	0
From stoves	0	2	3	1
Clothes from various causes	1	2	0	1

Total, 14.

Pensions for Scientific Labors.

Pensions have just been granted to the following persons by the British Government:—

Miss Elizabeth Baly and Miss Maria Josephine Fauvet (a joint pension), £100, in consideration of the late Dr. Baly's long career in the public service, and of the merit of the scientific medical works of which he was the author.

Mr. Richard Cort, £50 (in addition to his former pension of £50), on account of the great value and utility of his father's discoveries in the working of iron, and of his failure to derive any pecuniary benefit therefrom.

Dr. John Hart, Fellow of the Royal College of Surgeons in Ireland, £75 in consideration of his contributions to the science of anatomy and physiology, and of his being afflicted with blindness and broken health.

Mr. George Rainey, £100, in consideration of his labors in the field of minute anatomy and physiology, and of the many works on the subject which he has given to the public in the Transactions of learned societies without receiving any pecuniary remuneration.

Mrs. Janet Wilson and Miss Jessie Wilson, £100 (a joint pension), in consideration of the eminent services of the late Professor George Wilson, of Edinburgh, as a public teacher and a scientific man.

In 1848 the imports into the province of Otago, New Zealand, amounted to £11,869, and the exports were nil. In 1861 the imports amounted to £859,783, and the exports to £844,419.

ARMSTRONG'S GREAT GUN BROKEN.

[From the Mechanics' Magazine]

On Monday last another of those experiments on naval armor which have so important a bearing on our national defences took place at Shoeburyness. There was the usual attendance of Lords of the Admiralty, members of the Iron Plate Committee, a number of naval and military officers, engineers, iron manufactures and shipbuilders, as well as several foreigners, including agents of the Danish Government. A more than usual interest was excited on this occasion by the double attraction of the proposed trial of the full powers of attack with the 150-pounder Armstrong smooth-bore gun, and of a supposed improved plan of defence, in the form of an armor-plated target, representing a section of the frigate *Minotaur*.

The vessels of this class, of which four are being constructed, are designed larger, more powerful, and more effectually protected, than the *Warrior*. Great pains were taken in the department of the Controllers of the Navy to render the armor plating more effective than that of the *Warrior*. No new plan was adopted—the same system of enormous plates, teak backing, and through-bolt fastenings, was adhered to; but some of the ascertained defects of the *Warrior* plan were sought to be remedied by dispensing with tonguing and grooving the edges of the plates, reducing the thickness of the teak from eighteen to nine inches, and increasing that of the armor plates from four and a half to five and a half inches. These alterations, without testing their efficiency by experiment, appear to have given entire satisfaction to the Admiralty, since the construction of the ships of this new class of improved *Warriors* (as they were called) was commenced some months ago, and the armor plates were ordered, and the greater part of them, we believe, are manufactured, in full confidence, on the part of the authorities, of a complete success. It will be seen by the result of the trial that this expectation was lamentably disappointed. The alterations in a plan, already known to be defective, instead of removing, increased its defects, and one is left to wonder at the rash confidence which sanctioned an expenditure of half a million on a doubtful plan, without trial, and after the warning of previous failure, for the *Warrior* target was anything but a success.

In order to make a fair comparison between the *Warrior* and *Minotaur* targets the same frame was used for both. The three 4½-inch plates to the right of the port were stripped off, and replaced by the same number of 5½-inch plates, on nine inches of teak planking, and fastened with through bolts. Another modification consisted of iron plates 10 inches wide, and 1½ inches thick, let into the teak, and placed longitudinally at the back of the joints of the center and top and bottom armor plates. In former experiments, these joints were found to be weak places, and it was thought that the longitudinal plates would support the edges, and impart strength to the structure; but a little reflection might have shown that these back supports affording a hard bearing (iron) to the edges only, and leaving the central parts resting on a comparatively soft material (wood), the armour plates would be more easily penetrated. The target was supposed to be further strengthened by covering the joints of the skin plates, longitudinally, with ⅝-plates 18 to 20 inches wide, let into the back of the teak, and bearing against the outside of the skin.

Four round shot were fired from the 150-pounder Armstrong gun. The first three were cast-iron, weight 156 lbs.; the last wrought-iron, weight 162 lbs.; the charge in each case was 50 lbs. of powder; the range 200 yards. No. 1 struck the center plate (which is 9 feet long and 3 feet 4 inches wide) about 2 feet from the port, midway between the top and bottom edges. It penetrated the armor plate, making a hole 12 inches in diameter, and crushing through the teak backing, burst the ship's skin plate open, making three large cracks, through which splinters of wood protruded behind, split one of the frames across, broke off the points and nuts of four armor plate bolts, and four or five wood bolts. Several bolts of the plate above were started by the shock.

No. 2 hit the top plate (which, as well as the bottom plate, is about 11 feet long, and 3 feet 4 inches wide) about 3 feet from the left end, and about the middle between the upper and lower edges. This shot made a hole 12 inches in diameter through the plate, and forced a way through the teak backing and skin plate. Large fragments of the armor plate, including the front piece bearing the mark of the shot, were found on the ground 10 or 12 yards behind the target, and 5 or 6 bolt ends and nuts were broken off. Shelf pieces and caulking plates intended to support the skin plates inside were ripped off at the line of rivets. Two frames were cracked.

Fig. 1.

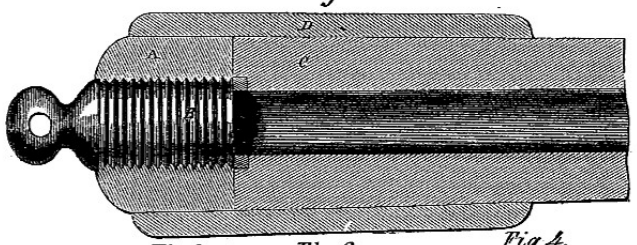
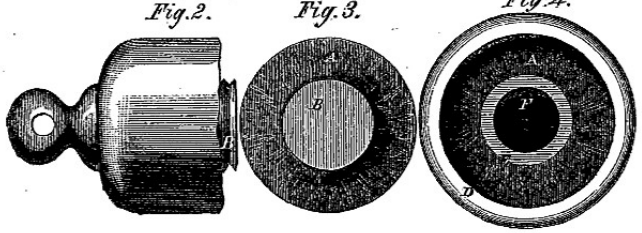


Fig. 2. *Fig. 3.* *Fig. 4.*



No 3 made a hole, of the same diameter as before, clean through the bottom plate, close to the upper edge, and equidistant from the butts. Large pieces of the shot and armor plate passed through the target; the cone of the shot imbedded in the portion of plate carried away at the moment of impact was picked up some yards in the rear. In addition to the hole through the armor plate, its upper edge was split longitudinally a length of 2 or 3 feet, showing the lamination of rolled iron. Two of the frames behind the skin were further damaged and broken in two, and several bolt ends and nuts broken off.

No. 4 struck the center plate about 3 feet from the right end. This shot, being of wrought iron, did not break up like the cast iron shot, which invariably fly into fragments, leaving a cone in front, but it flattened and stuck fast in the armor plate, leaving one-third of its diameter outside. This effect arises from the ball squabbing out from its own force, and becoming too large to pass through the hole made at the moment of impact. The diameter of the protruding portion measured 13½ inches, that of the shot being 10 inches. The effect of this missile was more destructive than that of the cast iron shot. Keeping entire it does all its work in damaging the target—whilst the latter expend part of their force in destroying themselves. Large pieces of the armor plate were driven through the target, crushing the wood backing to shreds, bursting a great opening through the skin plates, and completely smashing two more frames.

The discharge of this shot brought the distructive action of the 150-pounder to a close, for this colossal 12-tun gun, about which there has been so much controversy, burst in firing the fourth round. The entire breech end, weighing about 17 cwt., was blown off and carried 50 yards behind. There were no splinters, and no person was injured; but that is not surprising, because previous to every discharge the artillery men gave the dangerous monster a wide berth, the gun being fired by a long lanyard pulled by a gunner who was safely ensconced.

There is no denying that the gun had the best of it in this encounter. The target was so fearfully mutilated, that if it had been a ship afloat, seeing the effect of only four shots, she would have been in as bad a predicament as a timber ship. The injury to the armor plates and to the skin and frame, great as it was, was not so disastrous as the destruction of the fastenings. Three-fourths of the bolts which held the plates were gone. Of thirteen bolts, with which the center plate was secured, eleven were visibly broken, and probably the other two were also broken, although the heads or nuts had not come off. This damage to the fastenings arises from the plate, when struck, being bulged and driven into the wood backing, which affords no support, but yields to the blow; consequently, the butts buckle and start with a tremendous rebound from their bearings, tearing away the bolts. The three plates were dished—driven in at the center, and curled up at the ends, one nine inches and the other six or seven inches off from the wood backing. The Duke of Somerset put his finger on the main defect when he said, "I have seen plates after a few shots fall bodily off the side of the vessel, which then was in a worse position than a wooden ship."

But these results, probably, are to be attributed more to the inefficiency of the system of armor plating than to the power of the guns. At all events, it is proved by this last experiment that however defective the armor plating of the *Warrior* was found to be, that of the *Minotaur* class is worse; and it is impossible the question can remain in its present state. Two 68-pounder round shot were afterward fired separately at the bottom plate; they made deep indentations in the iron, but did not penetrate or damage the target.

It was remarked, as a singular exception to the effects of former target experiments, that the armor plates were not cracked at the bolt-holes. The explanation seems to be that the velocity and force of the projectile being so great as to penetrate the plates through and through, owing to the non-resistance of the wood backing, the shot did its work without causing the same amount of vibration as a shot at a lower velocity, on the same principle as a rifle ball will pass through a pane of glass without cracking it. In former experiments, heavy shot at low velocities, and shell which produced only slight indentations in the iron, caused extensive cracks at the bolt-holes.

We cannot close our report of this interesting trial of the power of artillery without putting our readers in possession, so far as we are able, of the precise nature and cause of the damage sustained by the great Armstrong gun. Having taken a prominent part in publishing what we believed to be a correct estimate of the defects of the system, we are anxious to establish the truth, and we hope, with the aid of the annexed diagrams (in which the same letters designate the same parts) to render a description of the present condition of the gun intelligible to our readers.

The manner of the accident, by the disclosing two sectional views of the breech at the time of fracture, afforded a complete illustration of the internal construction of the gun, which, if we may judge from the observations of machanical engineers and ordnance constructors who examined the broken parts, was not previously understood by the scientific public.

Fig. 1 represents a longitudinal section before the accident occurred. The muzzle end is truncated in the drawing to save space in our columns. The barrel, C D, in its whole length from the breech to the muzzle suffered no damage. It remained in position on the carriage apparently without a flaw. The line of fracture is 1⅞ inches from the inner surface of the breech-piece, B, which is a solid cylinder 15 inches

in length and 15 inches in diameter, forming an enormous screw, which fits into the worm cut into the outer cylindrical mass, A, the two screwed up forming the breech-end of the gun, which is 30 inches in diameter, and weighs 16 or 17 cwt. Fig. 2 represents the breech separated from the gun, showing the end, B, of the breech-piece projecting 1¾ inches. Fig. 3 is a front view of the section at the line of fracture looking at the breech. Fig. 4 is a similar view looking into the barrel; A, is the outer mass of the breech; B, the breech-piece; C, the coils forming the barrel; D, the external coils shrunk over the former; E, a copper disk, against which the outer edge of the face of the breech-piece was tightly screwed up to prevent the escape of gas in the rear; F, is the bore. The copper disk and screw arrangement at the breech appears to have been the cause of the accident, and, in the opinion of engineers competent to judge, is looked upon as a mechanical blunder. The pressure and close-fitting of the edges of the breech-piece to the copper disk were not sufficient to prevent the escape of gas, which passed behind the disk; consequently, the effect of the explosive force on the breech was not limited to the surface area of the bore of the gun, which is 10 inches, but was extended to the area of the breech-piece, or 15 inches in diameter, an increase in the proportion of 225 to 100. The destructive effect of the enormous pressure was aided by the cut of the screw in the mass, A, at the first thread of which the fracture took place, leaving 1¾ of the mass, A, in the barrel. The shear of the iron, 7½ inches thick all round, following the nick of the screw cut, is singularly clean and regular. The broken faces present a close granulated texture like cast steel, but the discoloration of the surface by the explosive gas rendered it difficult to form an opinion of the nature of the material.

The results of last Monday's experiments is a severe and double disappointment to the official authorites. The anticipated triumph of the great gun is annihilated at a blow. The theory of destructive capabilities of large guns on iron plates at long ranges is far from being confirmed in practice. If a 150-pounder on the Armstrong system, on which such implicit reliance was placed, bursts with the ordinary charge as a smooth-bore, how can it be expected to stand the immense increase of explosive force when rifled? and what chance does there seem to be that the 300, 600, and 1,000-pounders, on which the Defence Commissioners, founded the conclusions of their report, will ever be made available? The wisdom of Parliament in putting an end to the Spithead Forts is demonstrated. On the other hand the terrible damage sustained by the *Minotaur* target places the Admiralty in the awkward predicament of having to alter the system of armor-plating, for which an enormous expenditure has been incurred, and probably has been thrown away. This comes of trying experiments on a plan after it has been adopted. It is the old story of the stable door and the horse.

The *Engineer* says, that though the gun was broken by a 50-pound charge, it had been previously weakened by a charge of 90 pounds.

ON FORCE—LAWS OF MOTION.

[Continued from Page 100.]

Comparing the energy of the force with which oxygen and carbon unite together, with ordinary gravity the chemical affinity seems almost infinite. But let us give gravity fair play; let us permit it to act throughout its entire range. Place a body at such a distance from the earth that the attraction of the earth is barely sensible, and let it fall to the earth from this distance. It would reach the earth with a final velocity of 36,747 feet in a second; and on collision with the earth the body would generate about twice the amount of heat generated by the combustion of an equal weight of coal. We have stated that by falling through a space of 16 feet our lead bullet would be heated three-fifths of a degree; but a body falling from an infinite distance has already used up 1,299,999 parts out of 1,300,000 of the earth's pulling power, when it has arrived within 16 feet of the surface; on this space only $\frac{1}{1300000}$ths of the whole force is exerted.

Let us now turn our thoughts for a moment from the earth toward the sun. The researches of Sir John Herschel and M. Pouillet have informed us of the annual expenditure of the sun as regards heat; and by an easy calculation we ascertain the precise amount of the expenditure which falls to the share of our planet. Out of 2,300 million parts of light and heat the earth receives one. The whole heat emitted by the sun in a minute would be competent to boil 12,000 millions of cubic miles of ice-cold water. How is this enormous loss made good? Whence is the sun's heat derived, and by what means is it maintained? No combustion, no chemical affinity with which we are acquainted would be competent to produce the temperature of the sun's surface. Besides, were the sun a burning body merely, its light and heat would assuredly speedily come to an end. Supposing it to be a solid globe of coal, its combustion would only cover 4,600 years of expenditure. In this short time it would burn itself out.

What agency can then produce the temperature and maintain the outlay? We have already regarded the case of a body falling from a great distance toward the earth, and found that the heat generated by its collision would be twice that produced by the combustion of an equal weight of coal. How much greater must be the heat developed by a body falling toward the sun! The maximum velocity with which a body can strike the earth is about 7 miles in a second; the maximum velocity with which it can strike the sun is 190 miles in a second. And as the heat developed by the collision is proportional to the square of the velocity destroyed, an asteroid falling into the sun with the above velocity would generate about 10,000 times the quantity of heat generated by the combustion of an asteroid of coal of the same weight. Have we any reason to believe that such bodies exist in space, and that they may be raining down upon the sun? The meteorites flashing through the air are small planetary bodies, drawn by the earth's attraction, and entering our atmosphere with planetary velocity. By friction against the air they are raised to incandescence and caused to emit light and heat. At certain seasons of the year they shower down in great numbers. In Boston 240,000 of them were observed in nine hours. There is no reason to suppose that the planetary system is limited to "vast masses of enormous weight;" there is every reason to believe that space is stocked with smaller masses, which obey the same laws as the large ones. That lenticular envelope which surrounds the sun, and which is known to astronomers as the Zodiacal light, is probably a cloud of meteors, and moving as they do in a resisting medium they must continually approach the sun. Falling into it, they would be competent to produce the heat observed, and this would constitute a scource from which the annual loss of heat would be made good. The sun, according to this hypothesis, would be continually growing larger; but how much larger? Were our moon to fall into the sun it would develope an amount of heat sufficient to cover one or two years' loss; and were our earth to fall into the sun a century's loss would be made good. Still, our moon and our earth if distributed over the surface of the sun, would utterly vanish from perception. Indeed, the quantity of matter competent to produce the necessary effect would, during the range of history, produce no appreciable augmentation in the sun's magnitude. The augmentation of the sun's attractive force would be more appreciable. However this hypothesis may fare as a representant of what is going on in nature, it certainly shows how a sun might be formed and maintained by the application of known thermo-dynamic principles.

Our earth moves in its orbit with a velocity of 68,040 miles an hour. Were this motion stopped, an amount of heat would be developed sufficient to raise the temperature of a globe of lead of the same size as the earth 384,000° of the centigrade thermometer. It has been prophesied that "the elements shall melt with fervent heat." The earth's own motion embraces the conditions of fulfilment; stop that motion and the greater part, if not the whole of her mass, would be reduced to vapor. If the earth fell into the sun, the amount of heat developed by the shock would be equal to that developed by the combustion of 6,435 earths of solid coal.

There is one other consideration connected with the permanence of our present terrestrial conditions, which is well worthy of our attention. Standing upon one of the London bridges, we observe the current of the Thames reversed, and the water poured upward twice a-day. The water thus moved rubs against the river's bed and sides and heat is the consequence of this friction. The heat thus generated is in part radiated into space, and then lost, as far as the earth is concerned. What is it that supplies this incessant loss? The earth's rotation. Let us look a little more closely at the matter. Imagine the moon fixed, and the earth turning like a wheel from west to east in its diurnal rotation. Suppose a high mountain on the earth's surface; on approaching the moon's meridian that mountain is, as it were, laid hold off by the moon, and forms a kind of handle by which the earth is pulled more quickly round. But when the meridian is passed the pull of the moon on the mountain would be in the opposite direction, it now tends to diminish the velocity of rotation as much as it previously augmented it; and thus the action of all fixed bodies on the earth's surface is neutralized. But suppose the mountain to lie always to the east of the moon's meridian, the pull then would be always exerted against the earth's rotation, the velocity of which would be diminished in a degree corresponding to the strength of the pull. The tidal wave occupies this position—it lies always to the east of the moon's meridian, and thus the waters of the ocean are in part dragged as a brake along the surface of the earth, and as a brake they must diminish the velocity of the earth's rotation. The diminution, though inevitable, is, however, too small to make itself felt within the period over which observations on the subject extend. Supposing, then, that we turn a mill by the action of the tide, and produce heat by the friction of the millstones, that heat has an origin totally different from the heat produced by another mill which is turned by a mountain stream. The former is produced at the expense of the earth's rotation; the latter at the expense of the sun's radiation.

[To be Continued.]

Lobster Salad.

The Rev. Mr. Barham, the author of "The Ingoldsby Legends," gives the followiug receipt for salad;—

Two large potatoes, passed through kitchen sieve,
Unwonted softness to the salad give;
Of ardent mustard add a single spoon,
Distrust the condiment which bites too soon;
But deem it not, thou man of herbs, a fault
To add a double quantity of salt;
Three times the spoon with oil of Lucca crown;
And once with vinegar procured from town;
True flavor needs it, and your poet begs
The powdered yellow of two well-boiled eggs;
Let onion atoms lurk within the bowl,
And scarce suspected, animate the whole;
And lastly, on the flavored compound toss
A magic teaspoon of anchovy sauce;
Then, though green turtle fail, though venisons tough,
And ham and turkey are not boiled enough,
Serenely full the epicure may say,
"Fate cannot harm me, I have dined to-day."

Tastes vary; for our part we prefer to omit the onion and to introduce a small quantity of sugar. The following rule will produce a dish which we think quite as much as Mr. Barham's, will cause an epicure to be satisfied with his dinner whatever may be the quality of the other viands.

With a lobster weighing two pounds in the shell, cut one large head of fresh lettuce. Then, for the dressing, mix 6 table-spoonfuls of olive oil, 6 table-spoonfuls of vinegar, 2 table-spoonfuls of sugar, 2 tea-spoonfuls of mustard, 1 tea-spoonful of salt, and 2 hard-boiled eggs. The mustard may be used either dry or wet, and should be rubbed with the oil before the vinegar and other ingredients are added. All of the articles must be of good quality, especially the oil; and then the preparation is delicious.

ZOOLOGICAL.—A list of the vertebrated animals in the gardens of the Zoological Society of London has recently been issued. The Society's collection, which is supposed to contain the most extensive series of living animals in existence, embraces about 1,450 specimens, illustrating 188 species of mammals, 409 of birds, 62 of reptiles and 24 of fishes; altogether 683 species of vertebrates. There is, besides these, a large series of invertebrated animals of different classes kept in the house devoted to aquaria.

A FARMER in Walla Walla Valley, Washington Territory, last season raised from fifty acres of land, over three thousand bushels of barley, which he sold for the round sum of $10,000.

Correspondence

The Pulu for Mattresses.

Messrs. Editors :—In No. 5, of the current volume of the Scientific American, I notice you have copied from the New Bedford *Mercury* an item on the business of the Sandwich Islands, in which the writer speaks of pulu as being a kind of brown thistle down. I have been a resident of the Sandwich Islands for several years and know this to be an error. Pulu is gathered in great abundance, principally on the island of Hawaii, the largest of the group. It grows on the stalk or in the crotch of a species of the fern. This fern often grows to the hight of 10 or 12 feet and has a body from 2 to 8 inches in diameter. I have ridden through vast fields of this species of fern in the vicinity of the volcano Kilauea, that extended as far as the eye could see. On the edges of these fields nearest the volcanoes the lava has flowed and covered large tracks, forming plateaus upon which the natives have built pleasant hamlets, and are carrying on a lucrative business in gathering and drying the pulu for shipment to San Francisco, where it is extensively used for filling mattresses. From a single fern they gather a tuft about the size of a man's hand and spread it on the grass and lava banks, where it is thoroughly dried, then bagged and transferred on the backs of mules to the sea coast. There it is pressed in bales for shipment like cotton. Pulu and sugar are the principal exports from the Islands to California. Of rice there is scarcely enough raised to speak of, while extensive sugar plantations are becoming numerous, and a better quality of crude sugar cannot be produced elsewhere. Repeated experiments have been made in some localities for producing cotton, but have failed, perhaps for the want of a knowledge of the proper method of cultivation.

M. D. Myers.

Home Amusements.

Messrs. Editors :—I think that one of the most useful presents that we can make our young mechanics is a copy of your valuable paper, and as I have recently apprenticed a son to the carriage-making business, I intend to furnish him a copy of the Scientific American during his apprenticeship. One of the first duties of parents is to furnish their children with useful reading and home amusements ; a few dollars a year invested in this way has saved many a youth from bad associates and habits. I believe I have been doubly blessed in my family by always having my children at home instead of running the streets—kept at home by the attractions of home amusements. Inclosed is one dollar to pay for the present volume of the Scientific American to be sent to

Owen R. Crump.

Simcoe, Norfolk Co., Canada West.

[We agree with our correspondent most cordially in regard to the value of home amusements for young persons. God has so made us that it is as natural for us in youth to amuse ourselves as it is to breathe. If young people are debarred all innocent amusements they are in great danger of seeking those which are not innocent. We are glad to see that a recognition of this principle of human nature is becoving so widely disseminated in the world.—Eds.

To Keep Sweet Potatoes.

To keep the sweet potato for use through the winter requires much care. One great requisite is, to have the potatoes gathered before they are injured by frost or by remaining in cold soil after the vines are killed. Another very important item is to have them carefully handled. If they are dry when brought from the field they may be put up the following day, if moist they should be allowed to dry 24 hours before putting up. If muddy and wet, a longer time is needed. Throw out all cut and bruised ones.

The potatoes may be placed in boxes or bins of any convenient size, only that they must not contain potatoes more than 16 inches in depth, and if placed one above another must have an air space of at least two inches between the bottom of one and the top of another. They should be raised from the floor four inches, and not nearer any wall than three inches. Sprinkle a little sand in the bottom of the box, then fill half full of potatoes, then shovel in sand until the crevices are well filled, then fill up with potatoes and finish with sand, having an inch of sand above the top of the potatoes. The sand should be dry, dusty and screened if possible, so that it will run well. The best time to secure the sand is in the months of August and September. Dry it on a platform of boards in the sun, and store it away in a dry place. It will require about one-third as much bulk of sand as there is of potatoes to be put up. To keep well, the sweet potato needs an even temperature.

Making Mustard.

The use of mustard is of ancient date, extending back to the old Egyptians, who taught the Romans how to apply it to roast beef. The latter carried a knowledge of this art to England, the people of which island have become more distinguished than their teachers in its use. English mustard has acquired a high reputation, and it is sent to almost every part of the civilized world. A correspondent of the London *Chemist and Druggist* gives a description of Colman's great mustard manufactory at Norwich, from which we condense the following :—

There are two kinds of mustard seed employed, namely, the brown and the white. The former is much cultivated in England ; the latter in Germany. The brown seeds are very small, being no larger than the head of a small pin. They are the produce of what is called the black mustard—the *Sinapis nigra* of botanists. The white seeds come from the species *Sinapis alba*. The average price per bushel of the brown seeds is about $3, and of the white seeds $2 50. The seeds only appear in the markets of Weisbach and Marklane once a year, and the few manufacturers who use them are consequently compelled to keep large stocks. To preserve them for a long period is a task which the farmers have hitherto failed to accomplish, but in mustard warehouses the temperature and ventilation are so carefully regulated that the seeds will remain unchanged for years.

The preliminary operations of cleansing and drying the seed are performed by means of the ordinary drying machine and kiln. The kiln is similar to one used for drying corn, being a heated chamber floored with wire gauze. The sieves which are employed to separate the flour of the seed from the husk are all formed of silk tissue, and some are of extraordinary fineness. The room in which these sieves are used is now exposed to view, and for a few moments I am utterly bewildered with the rapid movements of the workmen and the machines. The men so uniformly colored with the yellow dust remind me of the demons of a pantomime, but what they are doing baffles my comprehension. On one side of the room is a series of vertical rods of wood, each of which has a bulb of iron at its lower extremity. These rods are continually jumping up and down like the beams of on old-fashioned stamping mill, in strong iron mortars, which are partially filled with bruised mustard seed. Before being subjected to these bruisers, the seeds are crushed between iron rollers to separate the fixed oil. The workmen who superintend the pounding machines are continually adding the crushed seed or removing the finished powder. When a man has to put his hand into a mortar, he gives the ascending pestle an upward jerk, which slightly increases the length of its stroke, and brings it under the influence of a simple catch. When he has adjusted the contents of the vessel to his satisfaction he releases the catch, and down comes the pestle as before. The pounded material, consisting of both the flour and the bran of the mustard seed, may be seen on every side, in great heaps of a golden yellow color. To part the chaffy scales from the impalpable powder is the object of the process which now claims my attention.

This process is a very common one, being simply that of sifting; but, as with the pounding, steam power here supplies the place of muscular force. The sieves are arranged loosely in frames, to which a rapid eccentric motion is given by means of revolving shafts. Each frame will hold eight sieves, and may be looked after by one man. The pestles on one side seem to be continally practising a monotonous jumping dance, and the sifting frames opposite to be suffering from some horrible nervous affection. The mustard flour is shaken through many sieves of different degrees of fineness, and when it leaves this room the remains of the seed coat are only visible to the microscopic eye.

The brown seeds and the white are never operated upon at the same time, as it is important that the two sorts of mustard should be mixed in definite proportions. The flour of the brown seed is far more pungent than that of the white, and is the essential constituent of the condiment. A mixture of the two sorts is, however, generally considered more palatable than the simple brown mustard flour. The mixing of the different kinds is a mere repetition of the sifting process.

The public generally suppose that it is impossible to obtain genuine mustard. Such, however, is not the case ; for although it is not denied that some of the qualities, to suit the tastes of consumers, are prepared with a certain admixture of the finest wheaten flour and a very minute proportion of turmeric, mustard can be procured perfectly genuine.

I am now shown the packing room, where a number of men and boys are performing feats of dexterity, far more surprising than the sleights of Robin or Frikell. I see a plain sheet of tin foil suddenly become a shapely case, and the cases are filled and then labeled with equal adroitness. The white, unblistered hands of the packers remind me of a peculiar fact connected with mustard. In the seeds or dry flour chemists do not find the acrid principle for which mustard is so remarkable. The flour must be wetted before we can enjoy it as a condiment, or make use of it for a blister. The pungent, volatile oil of the black mustard, and the biting acrid liquid of the white, both result from the action of water on some of the constituents of the seeds. The fixed oil, which is expressed from the seeds, is quite devoid of acrimony or pungency, and can scarcely be distinguished from rape oil.

Brass Founder's Ague---Disease Produced by Fumes of Zinc.

Dr. Greenhow, in a paper lately read before the Royal Medical and Chirurgical Society (London), stated that this disease had first fallen under his observation during a brief holiday visit to Birmingham in the autumn of 1858, and he had subsequently been able on several occasions to investigate its history and causes in Birmingham, Wolverhampton, Sheffield and Leeds. The symptoms have, as the name implies, some resemblance to an imperfect paroxysm of ague ; but they differ from it in this respect, that the paroxysms occur irregularly, and are distinctly traceable to exposure to the fumes of deflagrating zinc. The attack commences with *malaise*, a feeling of constriction or tightness of chest sometimes accompanied by nausea. These always occur during the after part of a day spent in the casting shop, and are followed in the evening or at bed time by shivering, sometimes succeeded by an indistinct hot stage, but always by profuse sweating. The sooner the latter follows the setting in of the cold stage, the shorter and milder is the attack, and the less likely is the molder to be incapacitated for work on the following day. Headache and vomiting frequently, but by no means, always accompany the attack, which at the worst is only ephemeral ; but the attacks are sometimes of frequent occurrence. Persons who have but lately adopted the calling, or who only work at it occasionally, and regular brass founders who have been absent from work for a few days, are more liable to suffer from this disease than those who work at it continually. The men themselves attribute this disease to inhaling the fumes of deflagrating zinc, and there can be no doubt that their opinion is correct. The remedy is to work in large, well ventilated brass foundries, and to employ a draught to conduct the zinc fumes out by the chimney.

Sales of Reaping, Mowing and Thrashing Machines.—The sales of agricultural machines and implements in California this year have been as follows :—Mowers, about 400 ; reapers, 200 ; thrashers, 50. In Stockton, mowers, 100 ; thrashers, 50 ; reapers, 20. In Sacramento, mowers, 50 ; thrashers, 20 ; reapers, 5. In Marysville, mowers, 20 ; reapers 10 ; thrashers, 5. Total : mowers, 570 ; reapers, 280 ; thrashers, 80. Totals in all, 930 ; and the season not closed by a month. The sales of plows, harrows and other implements, have been very fair.

Brunel's Mishaps.

The following is from an article on the Brunels in the *Quarterly Review*:—

Although Brunel died at the comparatively early age of fifty-three, it is even a matter of surprise that he lived so long. He had more perilous escapes from violent death than fall to the lot of most men. We have seen that at the outset of his career, when acting as assistant-engineer to his father in the Thames Tunnel, he had two narrow escapes from drowning by the river suddenly bursting in upon the works. Some time after, when inspecting the shafts of the railway tunnel under Box Hill, he was one day riding a shaggy pony at a rapid pace down the hill, when the animal stumbled and fell, pitching the engineer on his head with great violence: he was taken up for dead, but eventually recovered. When the Great Western line was finished and at work, he used frequently to ride upon the engine with the driver, and occasionally he drove it himself. One day, when passing through the Box Tunnel upon the engine at considerable speed, Brunel thought he discerned between him and the light some object standing on the same line of road along which his engine was traveling. He instantly turned on the full steam and dashed at the object, which was driven into a thousand pieces. It afterward turned out to be a contractor's truck which had broken loose from a ballast train on its way through the tunnel. Another narrow escape he had was on board the *Great Eastern* steam ship, where he fell down a hatchway into the hold, and was nearly killed. But the most extraordinary accident which befel him was that which occurred while one day playing with his children. Like his father Sir Marc, he was fond of astonishing them with sleight-of-hand tricks, in which he displayed considerable dexterity; and the feat which he proposed to them on this occasion was the passing of a half sovereign through his mouth out at his ear. Unfortunately, he swallowed the coin, which dropped into his windpipe. The accident occurred on the 3d of April, 1843, and it was followed by frequent fits of coughing, and occasional uneasiness in the right side of the chest; but so slight was the disturbance of breathing that it was some time doubted whether the coin had really fallen into the windpipe. After the lapse of fifteen days, Sir B. Brodie met Mr. Key in consultation, and they concurred in the opinion that most probably the half sovereign was lodged at the bottom of the right bronchus. The day after, Mr. Brunel placed himself in a prone position on his face upon some chairs, and, bending his head and neck downward, he distinctly felt the coin drop toward the glottis. A violent cough ensued, and on resuming the erect posture he felt as if the object again moved downward into the chest. Here was an engineering difficulty, the like of which Mr. Brunel had never before encountered. The mischief was purely mechanical; a foreign body had gone into his breathing apparatus, and must be removed, if at all, by some mechanical expedient. Mr. Brunel was, however, equal to the occasion. He had an apparatus constructed, consisting of a platform which moved upon a hinge in the center. Upon this he had himself strapped, and his body was then inverted in order that the coin might drop downward by its own weight, and so be expelled. At the first experiment the coin again slipped toward the glottis, but it caused such an alarming fit of convulsive coughing and appearances of choking that danger was apprehended, and the experiment was discontinued. Two days after, on the 25th, the operation of tracheotomy was performed by Sir Benjamin Brodie, assisted by Mr. Key, with the intention of extracting the coin by the forceps, if possible. Two attempts to do so were made without success. The introduction of the forceps into the windpipe on the second occasion was attended with so excessive a degree of irritation, that it was felt the experiment could not be continued without imminent danger to life. The incision in the windpipe was, however, kept open, by means of a quill or tube, until the 13th of May, by which time Mr. Brunel's strength had sufficiently recovered to enable the original experiment to be repeated. He was again strapped to his apparatus; his body was inverted; his back was struck gently; and he distinctly felt the coin quit its place on the right side of his chest. The opening in the windpipe allowed him to breathe while the throat was stopped by the coin, and it thus had the effect of preventing the spasmodic action of the glottis. After a few coughs the coin dropped into his mouth. Mr. Brunel used afterward to say that the moment when he heard the gold piece strike against his upper front teeth, was, perhaps, the most exquisite in his whole life. The half sovereign had been in his windpipe for not less than six weeks.

Ancient Glass.

In all works published on glass making, twenty years ago, the art of glass making is alleged to be of comparatively modern date. The discoveries of Layard in Niniveh, however, have thrown a new light upon the subject, and have conclusively demonstrated the fact that the ancients six hundred years before the Christian era, were acquainted with the art of glass making, and with the magnifying glass.

Two entire glass bowls, with fragments of others, found by Mr. Layard in one of the palaces at Nimroud, are supposed to be 2,600 years old, and are therefore the most ancient known specimens of transparent glass. These glass bowls were covered with pearly scales, the result of long immuration, which on being removed left prismatic opal-like colors of great brilliancy, showing under different lights the most varied and beautiful tints.

With the glass bowls was discovered a rock crystal lens, with opposite, convex and plane faces. Its properties could scarcely have been unknown to the Assyrians, and we have consequently the earliest specimen of a magnifying and burning glass. It was buried beneath a heap of fragments of beautiful blue opaque glass, apparently the enamel of some object in ivory or wood which had perished. Of this lens Sir David Brewster observes, "It is plano-convex, and of a slightly oval form, its length being $1\frac{6}{10}$ inches, and its breadth $1\frac{4}{10}$. It is about nine-tenths of an inch thick, and a little thicker at one side than another. Its plane surface is pretty even, though ill polished and scratched. Its convex surface has not been ground, or polished, on a spherical concave disk, but has been fashioned on a lapidary's wheel or by some method equally rude. The convex side is tolerably well polished, and though uneven from the mode in which it has been ground, it gives a tolerably distinct focus at the distance of $4\frac{1}{2}$ inches from the plane side. There are about twelve cavities in the lens that have been opened during the process of grinding it; these cavities doubtless contained either naphtha, or the same fluid which is discovered in topaz, quartz and other minerals. As the lens does not show the polarized rays at great obliquities, its plane surface must be greatly inclined to the axis of the hexagonal prism of quartz from which it must have been taken. It is obvious from the shape and rude cuttings of the lens, that it could not have been intended as an ornament; we are entitled, therefore, to consider it as intended to be used as a lens, either for magnifying, or for concentrating the rays of the sun, which it does, however, very imperfectly."

Sir David says further of this lens, that it is as sound as it was many thousand years ago when in the form of a crystal in quartz or rock crystal, which is pure silex and other regular crystallized bodies.

It has been remarked that there is perhaps no material body that ceases to exist with so much grace and beauty as glass when it surrenders itself to time and not to disease. In damp localities, where acids and alkalies prevail in the soil the glass rots, as it were, by a process which it is difficult to study. It may be broken between the fingers of an infant, and in this state we generally find in the middle of it a fragment of a thin fiber of the original glass, which has not yielded to the process of decay. In dry localities, where Roman, Greek and Assyrian glass has been found, the process of decomposition is exceedingly interesting, and its results singularly beautiful.

At one or more points in the surface of glass the decomposition begins. It extends round that point in a spherical surface, so that the first film is a minute hemispherical one of exceeding thinness. Film after film is formed in a similar manner, till perhaps twenty or thirty are crowded into the tenth of an inch. They now resemble the section of a pearl or of an onion. When the decomposition has gone regularly on round a single point, and there is no other change than a division of the glass into a number of hemispherical films, like a number of watch glasses within one another, the group of films exhibits in the polarizing microscope a beautiful circle of polarized light with a black cross. A small glass bottle now in the British Museum, found in the ruins of Nimroud, is said to be of equal age with the glass bowls already described. On this very interesting relic is the name of Sargon, with his title of King of Assyria, in cuneiform characters and the figure of a lion. In the excavations of the mound of Babel, amongst other interesting articles was found a number of small glass bottles, some colored, others ribbed and otherwise ornamented.

A most celebrated antique vase, which was for 200 years the principal ornament of the Barberini palace, and which is now designated the Portland vase, is a rich specimen of early glass manufacture. It was found about the middle of the sixteenth century inclosed in a marble sarcophagus within a sepulchral chamber, under Monte del Grano, about two miles and a half from Rome, supposed to be the tomb of Alexander Severus, who died in the year 235. It is decorated with white opaque figures in bas relief upon a dark blue transparent ground, the subject of which has not hitherto received a satisfactory elucidation, but the design and arrangement and more particularly the execution, are truly admirable. A part of the blue ground, *i. e.*, all below the handles, was originally covered with white enamel, out of which the figures have been sculptured in the style of a cameo, with most astonishing skill and labor.

Of the several specimens of glass brought to England by Mr. Layard, one, the fragment of a vase, when examined was of a dull green color, as though encrusted with carbonate of copper. This color was quite superficial, and the glass itself was opaque and of a vermilion tint, attributed to suboxide of copper. The outer green covering was due to the action of the atmosphere on the surface of the glass, and the consequent change of the suboxide into green carbonate of copper. This specimen is interesting as showing the early use and knowledge of suboxide of copper as a stain or coloring agent for glass. The ancients, employed several substances in their glass and colored glazes for bricks and pottery, but of which there remains no published record. But these glasses and other ancient works of art prove that they were familiar with the use of oxide of lead as a flux in their vitreous glasses, and with stannic acid and Naples yellow, as stains or pigments.

The Wick Tailors and the Sewing Machine.

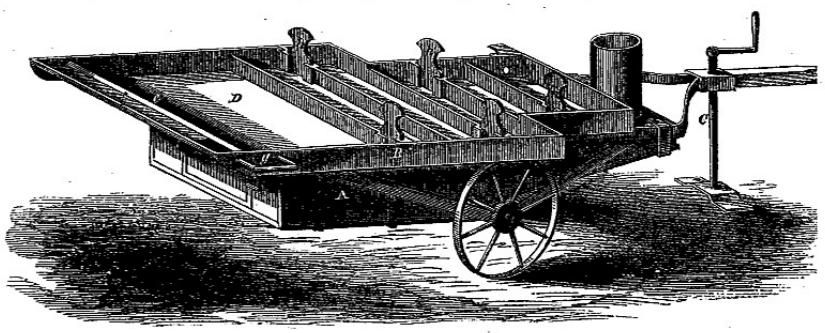
The *John O'Groat Scottish Journal* records in this ungracious manner two important events which occurred within the northern burgh. It says:—We regret to state that, just as our town clock ceased to strike the other day, a few tailors began to strike, and we suppose just because the clock stopped working they followed the example. Machinery was the cause in both instances. In the one case, the introduction by some of the more enterprising tailors of a sewing machine stopped the tailors; and, the old machinery getting dirty, stopped the clock. We equally regret both circumstances. We regret the tailors' strike—or, rather, the strike among a fraction of their community—because we deplore the ignorance that prompts them to this feeble attempt at stopping the march of improvement—the nineteenth part of a man (let alone the bulldog) trying his hand in the far north at staying the progress of the universal sewing machine! We regret the want of the strike in the other quarter simply because we don't know the time of day, and may be—for all we are aware—sending this communication a day or so late. The clock should be cleaned; we don't know if the tailors need this.

STRICT NEUTRALITY.—Some Liverpool merchants whose attempts to run the Southern blockade have recently been quite seriously interfered with by our vigilant cruisers in and around that notorious hole of villainy—the port of Nassau—have complained to Earl Russell that the law of nations is violated with impunity by our vessels. The Earl invites them to read the Queen's Proclamation, which enjoins upon them to do no act whereby either of the contending parties will be aided or abetted. It is a fact worth noting down, that the only vessels which have attempted to run the blockade are English. Their neutrality has been very strict in favor of the Confederates.

Improved Cane-Juice Evaporator.

We continue our illustrations of the improvements in evaporators—called forth by the introduction of the Chinese sugar cane into this country—by presenting an engraving of the apparatus invented by A. J. Low, of Uniontown, Pa. This is portable, and possesses some valuable peculiarities, as will be seen by the cut.

It consists of a furnace, A, mounted upon wheels, and covered by the shallow evaporating pan, B. The back end of the furnace is supported by a rod, *c*, so fitted in a step that it may be turned, and furnished with a screw and crank by which means the inclination of the pan may be adjusted at the proper angle for operation. The pan is divided by cross partitions into six compartments, and at its lower or back end corresponds with the furnace in width to the distance of two compartments on one side and three on the other, while its front or upper portion extends beyond the furnace to an equal distance in all directions.



LOW'S CANE JUICE EVAPORATOR.

The juice is poured into the compartment, D, and allowed to rest a while at a temperature of about 212° till most of the impurities rise in the form of scum. This scum is thrown by the ebullition of the juice to the foot of the inclined plane, *e*, where the liquor not being over the fire is less agitated and allows the scum to collect. It is then drawn by a suitable skimmer up the inclined plane into the trough, *f*, which is inclined toward the tube, *g*, so that any juice drawn up with the scum may flow through this tube into the pan; a strainer being interposed to prevent the passage of the scum. The gate, *h*, is then opened and the juice is allowed to flow into the next compartment, where after remaining a suitable time it is let into the next, and so on at proper intervals through the six compartments, parting in each with a portion of its water, and being subjected at each stage to a less intense heat than in the preceding stage. In the last compartment the evaporation is completed, and the concentrated juice is drawn off through a faucet.

The upper compartment, D, as soon as the juice is drawn from it it is replenished with raw juice, and thus the operation proceeds continuously. The improvement appears to be a very useful one.

The patent for this invention was granted July 16, 1862, and further information in relation to it may be obtained by addressing the inventor, A. J. Low, at Uniontown, Pa.

SEWING MACHINES IN ENGLAND.

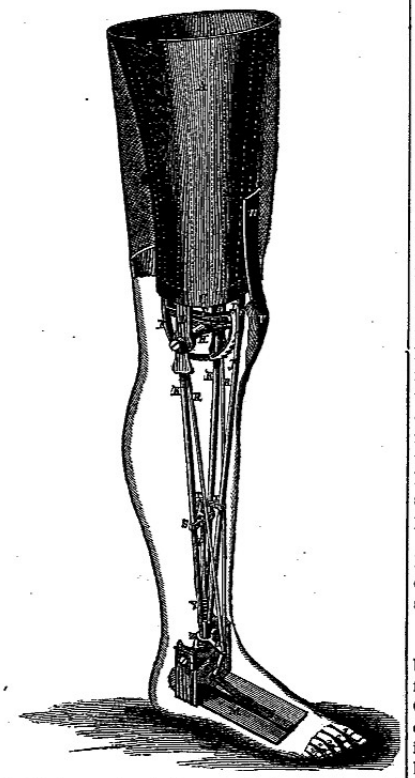
In the London Exhibition of 1851 there were three sewing machines; in the present one there are thirty. The number of such machines now in use in Great Britain is 25,000, and the capital invested in their manufacture in that country is about $115,000. These facts afford evidence of considerable progress made in England in ten years with the sewing machine, but as compared with its progress in America, it is scarcely worth naming. There are over 200,000 sewing machines now employed in America, and there are facilities possessed for turning out 100,000 per annum by the different manufacturers of them. These facts afford evidence of the enlightened zeal of our people in adopting and applying new and useful inventions. Our English cotemporaries are as enlightened, energetic and zealous for the introduction of labor-saving inventions as can be desired, and to their influence we justly ascribe much of the wisdom which has always been shown by British manufacturers in adopting new improvements, no matter whether they were invented in France, Germany or America. Unwise policy on the part of those who were assignees of the patent for the first American machine in England has retarded its progress in that country. The London *Mechanics' Magazine* says upon this subject, "Perhaps the extensive use of the sewing machine might not be signalized in England by such striking effects as in America, but we believe that its introduction into the workshop, the family and the factory is certain; and so believing, we shall consider it our duty to popularize them as much as we can."

French Invention—Indian Cotton.

A French paper states that a manufacturer of Alsace, has, by means of a new invention, succeeded in using the short silk cotton of India (hitherto pronounced to be unfit for the fabrication of fine goods), for all kinds of purposes. The *Journal des Debats* which notices the fact, says that French manufacturers are making as fine goods with that cotton as with the finest species New Orleans can send. It infers from this, that hereafter the price of Indian cotton will rise on a level with that of America. This may be true, as the most useful improvement in cotton carding machinery made in the present century, was by a Frenchman.

WHITE'S ARTIFICIAL LEG.

The inventor of the leg here illustrated says that having had the misfortune to lose a leg, he has had himself to experiment on, and he of course believes



that he has produced a leg superior to any other. It will be understood from an inspection of the engraving, in which A is the socket, made of canvas with steel braces, D D E F, &c., quilted into it. B is the covering to the socket, made of wire gauze; it serves to give power to the upper part of the leg. C is a steel band riveted to braces, D D E E, &c. The lower ends of E D, form part of the knee joint. The lower part of back brace, E, is bent in a semicircular form, the end is fastened to front brace, E, and held rigidly in place by crossbars, G, which, resting upon shaft, H, helps support the weight of the body. F is a spring fastened at the back to brace, E, at the front end hinged to ratchet, I, which slides on the semicircular part of E. K K and R R are steel rods which form the frame of the lower part of the leg. J is a steel rod with a catch at the upper end, which hooks into the ratchet, I. L is a shaft at the ankle joint. M is a steel plate to which is attached the frame supporting the ankle joint, and spring, N. S is a bar connecting, K K, and has attached to it with a hinge joint the lever *t*. *x* is a rod connecting lever, *t*, with rod, J. P is a reciprocating rod, made square at the lower end and passing through a square box, to which the lower ends of K K and J, are firmly attached; it is fastened at the bottom to shaft, L, the upper end touching the under side of the projection on lever, *t*, and held up by a spiral spring, *y*. *u* is an arm which holds the lower ends of rods, R R, in place. *o* is a rod connecting the rods, R R, with spring, N. V is the knee cap; W W the elastics. The lower part of the leg is covered with a case made of vulcanized rubber, the foot is made of cork with a joint at the end of plate, M.

When a step is taken the weight of the body compresses the spiral spring, *z*, forcing the rod, P, up against the projection on lever, *t*, the upper end of which, being carried backward, draws in the rod, J, till the catch is brought in contact with the teeth of the ratchet; as the body is carried forward the heel is raised from the ground and the weight comes on the spring, N, the spring, *z*, regains its former position on lever *t*, the upper end of which, being carried backward, draws in the rod, J, till the catch is brought in contact with the teeth of the ratchet; as the body is carried forward the heel is raised from the ground, and the weight comes on spring N, the spring, *z*, regains its former position, and the catch is released from the ratchet, allowing the knee to bend for the next step. If, while walking, one should stumble and step heavily upon the foot with the knee partly bent, the spring, F, to which the ratchet is attached prevents any sudden shock. The advantages claimed for this leg are, first, the ease with which it can be worn, the main bearing being upon the tuberosity of the ischium, the socket being perfectly ventilated, and while strong enough to support the weight of the body is so pliable that it will give to every motion of the muscles. Second, the ratchet and catch in the knee, which gives a feeling of security and therefore makes one walk more naturally. Third, the pliability of the socket and the flexion of the knee enable one to ride on horseback with perfect ease and security. Fourth, all parts, where either weight or friction comes, being steel, it is both light and strong, as little liable to get out of order as machinery can be, and when out of order can be easily and cheaply repaired.

The patent for this invention was granted June 24, 1862, and further information in relation to it may be obtained by addressing the inventor, Y. E. M. White, at New Bedford, Mass.

Spiral Fluted Nails.

The London *Builder* states that a company has been formed in that city for manufacturing spiral fluted nails—"the invention of W. Wizzell of Exeter." One of these nails 2½ inches long, it is stated, was driven into a pine plank, cleared its way as it went in and the wood was not split; such nails require no holes to be made for them and they cannot be withdrawn except with a screw driver. They revolve as they are driven in and are manufactured by machines each of which turns out about 4,000 per hour.

It is strange that this invention should have been patented in England after so many years. It was patented in this country by Samuel Pratts, of Boston, October 25, 1853, and is illustrated in the Patent Office Report for that year. We understand that the article is about to be manufactured in this city.

The Scientific American.

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VOL. VII. NO. 8.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, AUGUST 23, 1862.

THE STEAM WAGON IN THE FAR WEST.

On page 394 of our last volume, we noticed the departure for the west of the steam wagon built by John A. Reed, Esq., of this city, for General J. R. Brown, of Minnesota. The original intention of the proprietor was to take the wagon to Omaha for the purpose of operating with it between that point and Denver City, but he subsequently changed his mind as he found superior facilities for accomplishing his objects by making Nebraska City the initial point of operations. The steam wagon was therefore landed at that place, and the papers of the city noticed its arrival, and have described in flattering terms, the trials which have been made with it. The Nebraska City *News* of the 23d of July, in noticing the departure of the *Prairie Motor* for Denver on the previous Tuesday says, "it ran over the two steep hills west of the town with apparent ease. It was drawing at the time three road wagons containing five tuns of freight, two cords of wood, and all the wagons were crowded with excited citizens." Several experiments made with this steam wagon have afforded proof that it is adapted for the purposes of carrying freight and passengers on the peculiar common roads of that country. The distance between Nebraska and Denver is 605 miles, and 500 miles of the road pass over the perfectly level and dry valley of the Platte River. The road is therefore suitable for the large wheels of the wagon, which are ten feet in diameter and eighteen inches broad. It has hauled heavy loads on a grade of six hundred feet to the mile, and as there are no swamps on its route, the circumstances of the case and the nature of the country seem very favorable to its operation.

The traffic between the Missouri river, Colorado, and California is very great. Hitherto, oxen and mule teams have done all the heavy freighting, which amounts to two thousand loads per annum between Nebraska City and Denver alone—only two points. There are five regular stage routes between the Missouri river and the west, all of which concentrate at Fort Kearney. From Nebraska City to Denver the charge of stage for a single passenger is seventy-five dollars, and the time of travel occupies one week traveling day and night. Not to mention the great amount of overland travel between California and the Mississippi valley, there are nearly twenty-five thousand persons now in the Colorado Territory who are exclusively devoted to mining, and who, therefore, send all the products of their labor east, and receive in return food, clothing and other necessaries of life. Necessarily, therefore, a great trade is, and always will be, carried on between the east and west, giving employment to great caravans upon the boundless prairies west of the Missouri river. The citizens of Nebraska, in view of these facts, have regarded the introduction of the steam wagon with enthusiasm, as a great improvement upon the common slow and expensive system of animal teaming on the prairie roads. On the 28th of July last they met in mass convention at Nebraska City, and gave expression to their feelings upon the subject, and requested the authorities of the county to construct a road to its western limits suitable for the steam wagon, so as to make Nebraska City the focus of the steam wagon line. They believe that such a line of steam wagons at that city will improve its business and increase its wealth. The commissioners of Otoe county in accordance with the wishes of the people have, we understand, officially obligated themselves to construct a proper road for the use of steam wagons across their county, as soon as the necessary measures are perfected to ensure a daily steam line between Nebraska City and Denver. For constructing such a road the cost will probably be about eight thousand dollars, and this will cover the principal part of the expense for improving the leading route from the Missouri river to the Colorado gold fields. General Brown has come to New York to make arrangements for constructing his second steam wagon, and the people of Nebraska City have pledged themselves to have their road completed when this new steam wagon is landed at their levee. Not many months hence the mule and the ox will have to give place to the steam wagon on many of the western prairies.

ALDEN'S TYPE SETTING MACHINE.

We have examined a great many machines which displayed extraordinary ingenuity on the part of the inventors, but we never saw any other that approached in this respect the type-setting machine of Timothy Alden. The inventor devoted twenty years of his life to the labor of designing it, and all who examine it are impressed with the conviction that his mind must have been busy during this period. It was a task not to be performed in a day. He died just after his work was crowned with success.

Without the aid of elaborate engravings it would be impossible to explain the numerous devices and movements embraced in this wonderful piece of mechanism, but we may in a few words give a general idea of the plan.

A horizontal circular plate, about five feet in diameter, receives a constant rotary motion from steam or other power. Upon one side of the stationary frame is a rectangular key-board with 154 keys for the several type arranged in rows so as to occupy but little space. The type are arranged in radiating lines outside of the revolving plate. The plate carries 36 conveyors, each provided with a little clamp which seizes and holds the type; carrying it around with the rotation of the table. From each key a series of levers and pins is brought to act on the conveyor and prepare it to seize the type corresponding with the key as it passes the line in which the type is arranged.

The keys may be played more or less rapidly without any reference to the rate at which the plate is revolving, but if the operator gets more than sixty letters in advance of the machine, a bell rings, and then he must wait for the machine to overtake him.

The machine distributes type automatically without any care on the part of the operator, the distribution going on at the same time as the setting. In distributing, the conveyors are governed by certain nicks in the side of the type, each letter having its peculiar nick.

These machines are being exhibited in practical operation by Charles C. Yeaton, at 113 William street, in this city. We are informed that a company has been formed for their manufacture with a capital of $100,000, and that orders in considerable numbers have already been received from the leading daily papers. The price is $1,500.

PHYSICAL LAWS—CHANGES IN BODIES.

Although there are physical laws which determine the winds and the rains, there is much confusion of ideas prevailing respecting their nature. With respect to such confusion Sir John Herschell says:—"I may be allowed to suggest that it is high time that philosophers both physical and others should come to some nearer agreement than seems to prevail as to the meaning they intend to convey in speaking of causes and causation." This, "says Professor McCash," is sound doctrine, for there seems to be a general vagueness about the proper understanding of true principles, hence we find men well versed in some sciences writing obscurely on the fundamental principles of philosophy. This is one reason why so many persons have fallen into error and have confounded the properties of matter and the actions of matter under one idea."

"We are surrounded with various material substances. Chemistry lays down over sixty-five of these and we find them capable of producing changes on one another. The production of these changes is not capricious but according to certain invariable laws. Substances in chemical and mechanical combination are changed according to certain rules. These are the properties of the substance. All substances have their definite properties, which means a determinate way of producing changes on each other."

Bacon says:—"No body that is a single substance acts upon itself; when bodies act they do so upon one another. If we take any one particle of matter and separate it from all others it will continue in that state forever. To produce a change in an isolated body another body must be brought to operate upon it." The power which one body has of changing another, or of being itself changed by another is a property of that body, or the former may be called a power, the latter a susceptibility. All the properties of bodies—their powers, or susceptibilities consist in their capabilities of changing other substances, or of being themselves changed. All the properties of any given substance have thus a reference to some other substance, or substances and the production of changes upon them.

FRESH BREAD—COARSE AND FINE FOR THE ARMY.

A very large bakery, we have been informed, has been put up at Fortress Monroe, and it is stated to have facilities for baking 80,000 loaves daily. It has been erected for the purpose of supplying daily rations of fresh fermented bread to the army of the Potomac, and the loaves are to be sent up the river every morning to be distributed among the soldiers. This is good news. For months past this army has been chiefly supplied with hard crackers for bread, and the wounded had no better fare. Much of the sickness of the soldiers in Virginia, when on active service in the field, and thus prevented from obtaining fresh bread, can be traced to the constant use of dry hard crackers, not that this was not good food of its kind, but because men require frequent changes of food, and because unfermented bread is not so easily digested as fermented bread. In the early part of the Crimean war the British soldiers were supplied with hard biscuits exclusively, and the result was dysentry, scurvy and general disability. A remedy was provided in the form of fresh baked, fermented bread, supplied by Dr. Hamlin, the enlightened American missionary at Constantinople. He first contracted to supply 30,000 loaves daily; then increased the number to 60,000, and the result was most marked in the improved health of the soldiers. The mortality by sickness during the last year of the war, was less in the Crimea than in the barracks in England. Of course we do not attribute this favorable state of health in that army altogether to the use of fresh bread, but it was certainly one of the grand agencies which tended to secure it, and the same results may be expected from its use in the army of the Potomac. We trust that wisdom will characterize those who have the selection of the materials for making the army bread. It should not be made of fine wheaten flour exclusively, but a mixture of fine flour with middlings, or of unbolted ground wheat. From a great number of experiments made with bread formed of fine wheaten flour, rye flour, mixtures of fine flour with middlings (some of the hullings) and bread made of unbolted ground wheat, it has been found that the latter is the most healthy especially for soldiers. This is the reason why coarse bread, made of unbolted rye meal, and unbolted ground wheat, is chiefly used in all the European armies. A reason for this is found in the composition of the grain, and the arrangement of the substances of which it is composed. The inorganic salts—such as the phosphates, common salt, &c.—in wheat, reside chiefly in the husk, and a supply of these to the human body is as necessary to health as the starch and gluten which are chiefly contained in the interior of the grain. Bread made of fine flour devoid of several inorganic salts necessary to the health of man cannot be so suitable for the food of soldiers as the coarse bread made from unbolted wheaten flour, which contains such salts.

THERE are forty factories for the manufacture of glass in the city of Pittsburgh.

SUCCESSFUL RECRUITING AT THE SCIENTIFIC AMERICAN OFFICE.

Under the new war call of the country for 600,000 able bodied men to come forward in defence of the Government and the country, we felt called upon to devote some of our time to the business of obtaining recruits. On Monday 11th inst., we announced through the daily papers that we would give an additional bounty to ten or twenty men who would come forward at once and enlist. We decided for one day at least to convert our spacious office into a recruiting station and to try our hand at the novel business of getting soldiers. Our flag was thrown out early in the morning, and our office doors were thrown open to the approach of Union warriors. Soon four sturdy fellows entered and offered their services, and after a short preliminary examination we mustered our squad and marched them off to undergo the sacred ceremony of enrollment into the country's service, This was soon accomplished, and in one short hour these noble fellows were converted into uniformed troops ready to take up their march for "the tented field" to battle for our imperiled Government. One tall, well-limbed fellow, who represented himself as a rider on one of the canals, dressed in a tightly-fitting suit of what appeared to be heavy white drilling, wanted to join the cavalry service. We soon had him enrolled and equipped in true cavalry rig, and such a transformation we scarcely ever before saw/ so speedily brought about. The most famous necromancer of modern times could hardly beat it. From a begrimed and rusty canalman, in less than half an hour our hero sprung forth a dashing cavalier in full plume. As we shook him by the hand we promised him that we should watch for him in the hour of conflict, and should expect to hear of some heavy fighting whenever he was called to charge the enemy.

Our recruiting operations continued throughout the day, and before sunset we mustered eleven men into the service, all of whom will dishonor our address to them if they fail to come square up to the work when the battle-cry is sounded.

Some of our neighbors seeing our success in the recruiting business, offered at once to provide means to enable us to enlist thirty more men, and we hope before the close of the week to get our full quota ready for the field. These are times of sore trial to the nation. It stands or falls by the will of the people, and if we idly look on while the hosts of the South are striking at our national life, and fail to put forth our mightiest power, we shall sink into ruin and disgrace. It is for the people to say what shall be the issue.

THE NEW COMET.

On the evening of the 6th inst. we had a look at the new comet through Mr. Fitz's large telescope. No tail was visible, but a fan-shaped brush of cometary matter was thrown out toward the sun—the phenomenon that usually precedes the formation of the tail. This brush faded away into the sky without any defined boundary or other evidence of the comet's passage through a resisting medium. All of the phenomena of this comet will be carefully watched by many observers eager to see whether they will throw any light on the question of the existence of attenuated matter in space, or on any of the other unsolved problems of the universe.

We are pleased to learn that Mr. Fitz has sold the great telescope which we described some time since. It was bought by Dr. Wm. S. Vanduzee, of Buffalo, for the use of his daughters, who take much interest in mathematics and astronomy. Mr. Fitz has finished another instrument of the same size—16 inches in diameter.

STEAM ON CITY RAILROADS.

Experiments have lately been made in Boston with a locomotive for drawing cars on the city railways, and the papers state that its performances have proved very satisfactory. It is chiefly prejudice which prevents the use of steam as a substitute for horses on city railways. It is supposed by a great number of persons that if steam engines were employed on city railways, the danger to life would become imminent in our streets. This is a mistaken notion. Steam engines can be controlled more easily than horses, and they are just as safe. The opposition to such improvements is worthy of the dark ages. Similar hostility was manifested for years against the introduction of steam fire engines, but such prejudices have all been removed, to the wellbeing of all classes. We trust that the same spirit of progress may soon animate those who control the traffic on all city railroads.

Launch of a New Steam Frigate.

The new steam frigate *Lackawanna* was launched at the Brooklyn Navy Yard on Saturday the 9th inst:—The *Lackawanna* is a first clast single-banked frigate, 262 feet in length over all, 225 feet long on the load line; 33 feet 3 inches extreme width, and 17 feet 10 inches in depth; measures 1,600 tuns, and draws a proportionate depth of water. She has been built under the supervision of naval constructor Delano.

The machinery is now ready, and consists of two horizontal back-acting engines, with cylinders forty-two inches in diameter (eight inches less than those of the new *Ironsides*), and fifty inches stroke. The boilers, of which there are three, are Martin's patent. The propeller is fully fifteen feet diameter, and seventeen feet six inches mean pitch. The surface condenser is Jewell's patent, similar in all respects to those used in the gunboats recently built.

The *Lackawanna* is consort to the *Ticonderoga*, which is now going ahead in another ship house, and was commenced some time before the former. When the fleet, of which this vessel is one, shall have been completed, it will present the following naval force:—

Vessels.	Tuns	Officers and Men.	Guns.
Lackawanna.....	1,600	300	about 25
Ticonderoga.....	1,500	300	24
Shenandoah.....	1,400	300	24
Sacramento.....	1,600	300	25
Total.....	6,100	1,200	98

The *Sacramento* is launched and preparing for sea at Portsmouth, N. H., and the *Shenandoah* is building at Philadelphia.

Our Disposition toward Canada.

The Canadians are treated with much *sang froid* by the mother country, and they are, as civilly as words can express it, invited to "set up" for themselves. The Canadians, with few honorable exceptions, were terribly indignant towards us on account of that little *Trent* affair, and now after the thing is all over we think just as much of our neighbors as ever while England turns the cold shoulder toward these loyal colonies. The English are so stubborn that they will not believe our continued assertions that we neither do not wish, nor intend, to invade the Canadas. We would be glad to have them join us, and we cordially invite them to do so at once, but we have no idea of knocking this chip off John Bull's shoulder for the sake of a fight. The people of the United States are not disposed to war for conquest. In common with the people of all other nationalities we claim the right to struggle for our national existence until our efforts are crowned with success, if this be the will of Providence. We humbly say to Great Britain, France and all other nations, this is none of your funeral, therefore why do you seek for seats among the mourners?

Loss of the California Steamer Golden Gate.

The sad news comes to us from the Pacific that the steamship *Golden Gate*, which left San Francisco on the 21st of July, for Panama, with 230 passengers, a crew of over fifty men and $1,384,000 of gold and silver, was burned at sea on the 27th ult. We have not received definite information as to the origin of the fire, but it has been stated that it was first observed near the boiler room, and that the flames spread so rapidly that the pumps offered scarcely any resistance to their progress. The place where she took fire was off the coast of Mansanilla. The head of the vessel was turned toward the shore, and she was run aground at but a short distance from land. It was first reported that 200 passengers and 39 of the crew were lost, but recent news from the scene of disaster reduces the loss of life considerably. It is supposed that none of the treasure can be recovered. Statements have been made that the *Golden Gate* was amply provided with life boats and life preservers for a much larger number of persons than those who were on board. All steamers may be made fire proof, but there is not one afloat that may claim such a distinction. The *Golden Gate* was built in New York in 1850.

MISCELLANEOUS SUMMARY

ANNOUNCEMENT FOR THE MILLIONS.—One of the most indefatigable men in the world is Barnum the renowned showman. War, or no war, Barnum runs his 25-cent museum day and night with ever-increasing wonders. If his twenty-hundred fat woman should happen to melt down under the effects of the sultry heat, Barnum would speedily get something wonderful in her place that would not melt under the equator. If the whale dies the hippopotamus that wont die, takes his place, and thus he goes on in his career ever delighting the thousands who flock to his museum. His last novelty consists of a combined exhibition of the qualities of Gen. Thom Thumb and Com. Nutt, the two smallest men in the world, who know how to make themselves interesting.

HEREAFTER promotions in the army and navy are to be made by virtue of bravery in the field, and not because the aspirant is son, nephew or friend of some influential man. This is the true way to reward merit, and to increase the spirit of the army. Napoleon understood this matter perfectly. He watched for brave men in the ranks and gave them a chance to rise to the highest rank in the service.

PREMIUMS FOR LEATHER, &C.—The State Agricultural Society of New Jersey will hold a fair this year in Newton, Sussex county, commencing September 30th and closing October 2d. The list of prizes to be awarded extends through twenty three columns of pamphlet: among them we notice diplomas for nine different kinds of leather, besides six for boots, shoes and gaiters, and three for saddlery and harness.

TOO SLOW.—By this time we might have had twenty vessels superior in every respect to the *Merrimac* and *Arkansas* which have come and gone in the rebel service. It is no exaggeration to say that with the immense mechanical power of the country at Goverment disposal, this could have been accomplished.

HOW VOLUNTEERING PAYS.—It is said that in Truro, Massachusetts, the quota assigned to the town has been enlisted from one family consisting of four sons. They received a bounty of $325 each—total $1,300; clubbed the funds, and purchased a farm for the "old folks," whom they leave in possession while they go to the war.

WEED, Becker & Co., axe and edge tool manufacturers at Cohoes, N. Y., have lately built extensive additions to their factory.

A NEW mill site has been purchased at Holyoke, Mass., by Wm. E. Rice for the erection of a large wire factory.

ABOUT 1,100 men are now employed on iron-clad monitors at Rowland's Continental Works, Greenpoint, L. I.

THERE are 20,000 persons at present in the service of the United States Government engaged in building new and repairing old vessels for the navy.

Reappearance of the Rings of Saturn.

The Boston *Traveler* states that the rings of Saturn were again seen on the 12th inst., after having been wholly invisible, except through the most powerful telescopes, nearly three months. In the course of the last eight months these rings have twice disappeared, the first time, from Nov. 23 to Jan. 31, in consequence of their edge being turned toward the earth and the second time, or since May 17th, their unilluminated side. Through powerful telescopes the rings at the first disappearance could however be seen, as a straight line, and at the second the ansae or extremities were still visible.

During these interesting periods, the appearance of Saturn and its rings has been carefully watched by astronomers, and in a communication to the London Astronomical Society, at its last meeting, that excellent observer, Rev. W. R. Dawes, says, "Nothing I imagine can more fully prove the almost inconceivable thinness of the rings than the absence of all perceptible shadow. Had it even the least thickness which has ever been ascribed to it (forty miles by Professor Bond, Director of Harvard College Observatory, Cambridge, U. S.,) it would be sufficient to produce a total eclipse of the sun on Saturn's equator, as it would subtend an angle more than double that subtended by the disk of the sun as seen from Saturn."

CENSUS STATISTICS OF 1860.

[Continued from our last.]

We present this week those portions of the statistics from the preliminary chapters of the census report, which relate to the production of machinery, and the materials for its manufacture and use. The higher a people is advanced in civilization, the better will be the tools, instruments and machines with which it works, and the larger will be the number of people employed in making these instruments. At the present time the civilized nations of the world seem to be transforming themselves into communities of machinists.

GENERAL MACHINERY.

The annual product of the general machinists' and millwrights' establishments, as returned in the census of 1850, was valued at $27,998,344. The value of the same branch, exclusive of sewing machines, amounted in 1860 to $47,118,550, an increase of over eighteen millions in ten years. The Middle States were the largest producers, having made over forty-eight per cent of the whole, but the Southern and Western States exhibit the largest relative increase. The ratio of increase in the several sections was as follows:—New England, 16·4 per cent; Middle States, 55·2; Southern, 387; and Western, 127 per cent. The Pacific States produced machinery of the value of $1,686,510, of which California made $1,600,510. In Rhode Island the business was slightly diminished; but in Connecticut it had increased 165 per centum. The great facilities possessed by New York and Pennsylvania in iron, coal and transportation made them the largest manufacturers of machinery, which in the former was made to the value of $10,484,863, and in the latter, $7,243,453, an increase of 24·4 and 75 per cent respectively. New Jersey raised her product to $3,215,673, an increase of 261 per cent, while Delaware and Maryland, and the District of Columbia exhibited an increase of 82,41, and 667 per cent respectively. In all the Southern States the value of the manufacture, though small, was largely increased; the ratio in Virginia, the largest producer, being 236 per cent, while in Mississippi, Alabama and South Carolina, the next in amount of production, $1,626,270 and 525 per cent respectively. This was exclusive of cotton gins, which were included with agricultural machinery. Ohio was the largest producer in the West, and the fourth in the Union, having made to the value of $4,855,005, an increase of 125 per cent on the product of 1850. Kentucky ranked next among the Western States, having produced over one million dollars worth, and increased her product 213 per cent. The ratio of increase in the other Western States, was:—In Indiana, 98; Illinois, 24; Wisconsin, 208; Missouri, 214, and Iowa, 2,910 per cent respectively; but in Michigan there was a small decrease in the amount manufactured.

SEWING MACHINES.

The returns show an aggregate of 116,330 machines made in nine States in 1860, the value of which was $5,605,345. A single establishment in Connecticut manufactured machines to the value of over $2,700,000, or nearly one-half of the whole production in that year. During the year 1861 sewing machines to the value of over $61,000 were exported to foreign countries.

IRON.

The quantity of pig iron returned by the census of 1860 was 884,474 tuns, valued at $19,487,799, an increase of 44·4 per cent upon the value returned in 1850. Bar and other rolled iron amounted to 406,298 tuns, of the value of $22,248,796, an increase of 39·5 per cent over the united products of the rolling mills and forges, which in 1850 were of the value of $15,938,786. This large production of over one and a quarter millions of tuns of iron, equivalent to 92 pounds for each inhabitant, speaks volumes for the progress of the nation in all its industrial and material interests. The manufacture holds relations of the most beneficial character to a wide circle of important interests intimately affecting the entire population: the proprietors and miners of ore, coal and limestone lands; the owners and improvers of woodlands, of railroads, canals, steamboats, ships and of every other form of transportation; the producers of food, clothing and other supplies, in addition to thousands of workmen, merchants and capitalists and their families, who have directly participated in the benefits resulting from this great industry. It has supplied the material for an immense number of foundries, and for thousands of blacksmiths, machinists, millwrights and manufacturers of nails, hardware, cutlery, edged tools and other workers in metals, whose products are of immense aggregate value and of the first necessity. The production of so large a quantity of iron, and particularly of bar iron, and the demand for additional quantities from abroad, tell of the progress of the country in civil and naval architecture and all the engineering arts; of the construction of railroads and telegraphs, which have spread like a net over the whole country; of steam engines and locomotives, of spinning, weaving, wood and metal working, milling, mining and other machinery, and of all the multiform instruments of science, agriculture and the arts, both of peace and of war; of the manufacture of every conceivable article of convenience or luxury of the household, the field or the factory. The aggregate statistics of iron exhibit the extent to which the general condition of the people has been improved by this great agent of civilization during the ten years embraced in this retrospect.

The materials for the manufacture of iron—ore, coal and other fuel, water power, &c.—are so diffused, abundant and cheap that entire independence of foreign supplies appears to be alike desirable and attainable at no distant period.

IRON FOUNDRIES.

Besides a large amount of machinery and other castings included in the returns of machine shops, the value of the production of iron foundries, returned by the census of 1860, reached the sum of $27,970,193; an increase of 42 per cent on the value of that branch in 1850, which was $20,111,517. New York, whose extensive stove foundries swell the amount of production in that State, made to the value of $8,216,124, and Pennsylvania, $4,977,793, an increase of 39 and 60·9 per cent respectively.

COAL MINES.

With the subject of iron and its various manufactures that of fossil fuel naturally associates itself. The unequaled wealth and rapid development of the coal fields of the United States as a dynamic element in our industrial progress affords one of the most striking evidences of our recent advance. The product of all the coal mines of the United States, in 1850, was valued at $7,173,750. The annual value of the anthracite and bituminous coal, according to the eighth census, was over $19,000,000. The increase was over $12,000,000, and was at the rate of 169·9 per cent on the product of 1850. It was chiefly produced in Pennsylvania, Ohio and Virginia. The coal mines in Pennsylvania, in 1850, was valued at $5,268,351. In the year ending June 1, 1860, the State produced 9,397,332 tuns of anthracite, worth $11,869,574, and of bituminous coal, 66,994,295 bushels, valued at $2,833,859, making a total value of $14,703,433, or an excess of $7,529,683 over the total product of the Union in 1850. Of bituminous coal, Ohio raised 28,339,900 bushels, the value of which was $1,539,713; and Virginia, 9,542,627 bushels, worth $690,188. The increase in Ohio was $819,587, and in Virginia, $222,780, in the value of mineral fuel, being at the rate of 113 per cent in the former, and 47·6 per cent in the latter. The increase in Pennsylvania was 179 per cent on the yield of 1850.

Improvement in the Manufacture of Iodine.

From an article, by C. A. C., in the *Irish Country Gentleman's Journal*, we make the following extracts:—

One of the most numerous and widely, spread orders of plants is the sea-weed family or Algæ. Although but one of the 220 orders into which certain botanists have arranged the members of the vegetable kingdom, it embraces, according to Lindley, no fewer than 288 genera, including about 2,000 species. Although termed sea-weeds, many of the plants belonging to this order are found in lakes, rivers and marshes. The curious vegetable production, *Protococcus nivalis* or red snow, belongs to it; the green, brown and red colors of certain seas, lakes, and even icebergs are due to their containing immense numbers of minute Algæ. Irish or Carrageen moss, the yeast plant, the vinegar plant, that delectable article in the *cuisine* of the Chinese—"edible bird's nest;" the minute species of *Diatomaceæ*, which are only recognized by the aid of the microscope, and were long mistaken for animalcules, the huge sea-plants, one of which measured 700 feet in length, discovered by Ross in the South Polar Sea, and many other remarkable plants, belong to this important order.

In both a manufacturing and an agricultural point of view, this division of the vegetable kingdom merits importance. One of the sub-orders into which it is divided—the sea-wrack tribe or *Fugaceæ*, is extensively employed as a fertilizer of the soil, and as a source of iodine and other substances of extensive application in the arts and medicine.

Iodine is an elementary substance which, in both its free and combined state, is extensively employed in the curative art, and is all but an indispensable agent in the various photographic processes. It is a common but sparse constituent of several of the lower animals, such, for instance as the common and horse sponge, the oyster, and various species of *Flustrea Sertulari*, *Tubularia* and *Rhizostoma*. It occurs more abundantly in the vegetable kingdom. In a great variety of land plants traces of it have been detected; but, as might be expected, those on the sea coast and the marine plants contain it in largest proportions; the largest yield being obtained from the various species of Fucus. These plants are collected by the inhabitants near the shore, dried in the open air, piled in heaps and burned. The residuum is termed kelp, and is either applied as a manure or employed in the manufacture of iodine, bromine and chloride of potassium, with several other incidental substances. The manufacture of iodine is rather an important branch of industry, and in France occupies several thousand persons. In Ireland there are, we believe, but one or two manufactories in which the article is prepared—namely, Mr. Ward's, of the County of Donegal; and a small one at Galway. As, however, the raw material abounds to excess in this country, and as there is a good demand for the manufactured article, there is no good reason why the preparation should be confined to two districts. That this belief is not peculiar to ourselves is evident from the prospectus of a company which now lies before us. This prospectus states that Mr. M'Ardle, formerly the operative chemist in the Apothecaries' Hall of Ireland, has discovered a method of preparing iodine from sea-weeds, by which a yield 400 per cent greater than by any other process is obtained. At present the kelp is prepared by completely dissipating, by the agency of fire, the organic portion of the plants, during which process there is a continuous loss of iodine, which, even in combination with sodium or potassium, is partly dissipated at a high temperature. To prevent this loss Mr. M'Ardle proposes to ferment the plants in tanks or other convenient vessel, whereby the organic portion will speedily be resolved into its constituent elements—invisible gases—which will escape, leaving a fluid in which all the mineral matters originally contained in the plants will be found, unaltered in composition and undiminished in quantity.

The Effects of Marriage with Blood Relations.

The London *Lancet* contains the following interesting observations on this subject:—

The consequences of intermarriage have been the subject of much declamation and but little sober inquiry. Evils of every kind have been depicted by some and totally denied by others. Those who denounce and those who favor within limits the practice of intermarriage are both devoid of any large series of observation, or of any perfectly conclusive chain of argument. But it must be said that the balance of facts is in favor of the former.

We read in an abstract from a communication, addressed to the Medical Society of Berlin, by Dr. Liebreich, some interesting remarks on the evil consequences of marriages between relations. Dr. Liebreich affirms that surdo-mutism, idiocy, and a chronic inflammation of the retina, by which the latter becomes affected with an infiltration of coloring matter which impairs vision—whence the name *pigmentary retinitis*—are in one half of the cases ascribable to marriages between close relatives. Most cretins, according to Maffei, are unable to see very small objects placed close to them; and Dr. Liebreich states that out of fifty idiots observed by him, three were suffering under pigmentary retinitis. One of these idiots belonged to a noble family, which had very seldom in the course of ages contracted alliances with other families, and the members of which had therefore very frequently intermarried among each other. The afflicted person's father had married a cousin of his, by whom he had thirteen children; two of these died early, two became blind owing to pigmentary retinitis, and a fifth was both blind and afflicted with idiocy. One of his sisters married a cousin, and she had an idiot among her children.

Mackenzie remarks the coincidence of blindness with surdo-mutism. Dr. Liebreich confirms the fact, showing that out of the 241 deaf and dumb now in the asylum at Berlin, there are fourteen having pigmentary spots on the retina, and, out of these fourteen, eight are of Jewish descent; and it is well known that among the Jews marriages with relations are frequent. For the same reason surdo-mutism alone, is, according to Dr. Liebreich, often met with among the Jews; for while at Berlin there is but one deaf and dumb Christian to 1,477 of the same creed, with the Jews the proportion is one to 368. In the fourteen cases mentioned above, the consanguinity between father and mother was verified five times. In another group consisting of eighteen cases, in which retinitis alone was observed without deafness, there were eight patients whose parents were cousins german, and five the consanguinity of whose parents remained doubtful.

NEW METHOD OF PROPELLING STEAMERS.—A small steamboat of twelve tuns burden has been built at Glasgow, Scotland, to test a new method of propulsion. The vessel has no rudder, but is steered, and most admirably and readily steered, by the propelling apparatus. This apparatus is fixed at the stern, and consists of a horizontal iron wheel, from which project six spokes also horizontal, and, attached to the end of each spoke, and dipping vertically into the water, is a blade, working in the same way as the blade of a feathering paddle—namely, turning its "feather edge" to the water as it goes forward, but the full face when moving in the direction necessary for propelling the vessel.

THE new colossal statue of Christopher Columbus, in Genoa, has been placed upon its pedestal by powerful steam machinery.

RECENT AMERICAN INVENTIONS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list :—

Improvement in the Manufacture of Sugar.—This invention consists in the employment of phosphate of ammonia, in conjunction with sulphurous acid or any of the sulphites, in the manufacture of sugar from cane or other juice, and in the refining of raw sugar. Edward Beanes, of Havana, in the Island of Cuba, is the inventor.

Sails for Ships and Other Vessels.—This invention consists in the construction of a sail, to spread and furl by a movement about a central point or points, also, in a certain novel construction of the truss which attaches the sail to the mast, and further, in a novel combination of a yard, truss and swinging arms for spreading the sail. The objects of the invention are: First, to enable the sail to be conveniently reefed and furled from the deck. Second, to enable the sail to be kept flat or prevented from bellying. Third, to distribute the strain more equally over the different parts of the sail than is done in a sail constructed and applied in the usual manner. Fourth, to get the weight of the sails as low as possible, and enable the weight of the topmasts of vessels to be reduced. William H. Mallory, of New York city, is the inventor.

Construction of Clock Cases.—This invention relates to an improvement in the construction of that class of clock cases which are constructed of sheet metal in cylindrical form, and designed chiefly for small clocks. The object of the invention is to simplify and economize in the construction of the kind of case specified, and, at the same time, obtain a case equally as durable and desirable in every respect. To this end the invention consists in forming the case of a single piece of metal, so spun or otherwise formed that it may receive the dial which is thereby made to serve the office of a brace or strengthening partition for the case, and the latter be provided with an external recess to receive the sash, and also provided with a back flanch, and the sash hinged directly to the case. G. B. Owen, of New York city, is the inventor.

Rudders for Ships.—One of the most serious accidents that can befal a ship or other vessel at sea, is the loss or disablement of the rudder, owing to the extreme difficulty of applying a new one constructed on the usual plan, which has to be applied from outside the vessel, and of the no less difficulty of repairing the disabled one. The object of this invention is to provide a remedy for such an accident; and to this end it consists in the construction of the blade of a spare rudder, to be carried on board of the vessel, or of the proper rudder of the vessel of two separate parts, one of which is capable of being drawn into the other, in such a manner as to permit the blade to be lowered or raised through the port provided in the deck and stern of the vessel for its stem and head to work through, without making the said port of larger size than is necessary for the head and stem, the said separate parts of the blade being combined by oblique slots and pins, and the part which is drawn into the other being operated by a rod passing through the stem and head. The inventor is J. C. Raymond, of Brooklyn, N. Y.

Boat for Shallow Streams.—The object of this invention is to obtain a boat capable alike of locomotion on land and water, being designed more especially for the navigation of shallow rivers, or such as are obstructed by sand bars. The invention consists in the employment of an endless jointed track, with an endless flexible band, armed with floats in combination with the truck and propelling wheels of the boat, whereby it is adapted to use on land or water indiscriminately, having all the advantages of a rail car in the one case, and of a steamboat in the other. The invention also consists in a peculiar construction of compound rudder for steering the boat in the water. This contrivance is the invention of A. Templeton, of Chicago, Ill.

Power of Wind Wheels.—The object of this invention is to transmit in the simplest manner, the power from a wind wheel shaft to the machinery to be driven, and by such means which will not in the least degree interfere with the proper traversing of the cap in which the bearings of the wheel shaft are placed, and which will at the same time admit of the journals of the wheel shaft, having an equal pressure on each of its bearings, so as to ensure an easy working of the moving parts, attended with a comparatively small degree of friction. The invention is more especially designed for operating reciprocating pumps, but may be used for driving other machinery having a reciprocating movement. The inventor is C. C. Moore, of New York city.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING AUGUST 5, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

36,064.—S. T. Adams, of Medina, Ohio, for Improved Washing Machine :

I claim the rubber, D, provided with two series of rollers set at an angle to each other, and separated by the dividing board, F, in which they have a bearing, in combination with the concave, provided with the fluted slats, a a, which are placed at an angle to each other, and whose ends connect under the dividing board as represented, the whole being constructed and arranged, substantially as and for the purpose herein specified.

36,065.—W. P. Battey, of Utica, N. Y., and W. N. Taylor, of Philadelphia, Pa., for Improvement in Gas Retorts :

We claim, first, A gas retort so constructed as to be capable of use in reversed position, substantially in the manner and for the purpose set forth.

Second, We claim, in combination with the gas retort, A, the removable heads, F, substantially in the manner and for the purpose set forth.

Third, We claim the use of two or more chambers, in combination with a gas retort, constructed substantially in the manner and for the purpose set forth.

36,066.—Roberts Bartholow, of U. S. Army, for Improved Solid Cartridge :

I claim the use of the within-described water-proof solid cartridge, compounded and constructed substantially as herein specified.

36,067.—Edward Beanes, of Havana, Island of Cuba, for Improvement in the Manufacture and Refining of Sugar :

I claim the employment of phosphate of ammonia, in conjunction with sulphurous acid, or any of the sulphites, in the manufacture and refining of sugar, substantially as and for the purpose herein described.

36,068.—Edward and John Bourne, of Pittsburgh, Pa., for Improvement in Radiators :

We claim, first, The application and use of short conical or funnel-shaped air tubes or flues, d d d d d d, passing transversely through the steam space, between the sheets forming the radiator, in the manner and for the purpose as herein before stated.

Second, We claim combining with a radiator, formed of thin metallic sheets, a series of steam pipes, s s s s s s, having openings, h h h h, Fig. 3, communicating with the space between the sheets, for the purpose of conducting the steam rapidly to all parts of the radiator, and also as a means of stiffening the sheets by acting as braces thereto, as herein set forth.

36,069.—T. R. Brent, of Muscatine, Iowa, for Improvement in Corn Planters :

I claim the cam wheel, I, provided with projections, f f, as shown, and placed in the adjustable frame, H, which is connected at its front end by a hinge or joint, e, to the bar, a, of the frame, A, and connected at its back end to the crank, J, of the shaft, K, in combination with the levers, M M, attached to frame, H, and connected at their front ends to the seed slides, F F, all arranged as and for the purpose herein set forth.

[This invention relates to an improved corn planter, of that class designed for planting corn in hills, and in check rows, and consists in the employment or use of a cam wheel placed in an adjustable frame, and arranged with levers and slides, in such a manner that the seed will be dropped automatically, by the forward or draught movement of the machine, and the seed-dropping mechanism at the same time be under the complete control of the driver, so that it may be stopped or put in any motion at any time, as circumstances may require.]

36,070.—E. Y. Chevalier, of Fort Wayne, Ind., for Improvement in Beehives :

I claim the drawer, B, provided with the feed receptacle, e, and the ventilating compartments and moth traps, d d, the latter being provided with adjustable slats, h, and wire cloths, g g, and all arranged relatively with the hive, to operate as and for the purpose set forth.

[This beehive, it is believed, possesses many advantages over others in general use, due provision being made to guard against moths, and a perfect ventilation of the hive obtained.]

36,071.—J. D. Christie, of Hackensack, N. J., for Improvement in Water Elevators :

I claim the hollow or tubular shaft, B, with the ratchet, D, and flanch, E, attached, in combination with the stationary or fixed shaft, F, with ratchet, G, attached, and the box or drum, I, with pawl, J, secured to it, and the slide or brake, L, fitted in drum, I ; the above parts being used with the disk, M, and all arranged for joint operation, as and for the purpose herein set forth.

[This invention consists in a novel arrangement of parts, as herein after fully shown and described, whereby articles may be raised to the desired hight and lowered as desired, at any time, at a quick or low speed, as circumstances may require.]

36,072.—Castle Churchill, of New Hartford, Iowa, for Improvement in Seeding Machines :

First, I claim the attaching of the hopper or hoppers, to a frame, K, hung or placed loosely on the rod, J', in combination with the tooth bars, I, connected at their lower ends by chains, d, to the frame, K, and fitted at their back ends loosely on the rod, J', whereby the teeth, H, may be raised from the ground by raising the hopper and frame, K, as described.

Second, The combination and arrangement of the hopper frame, K, and tooth bars, I, as and for the purpose specified.

[This invention consists in a novel way of dropping the seed, or discharging the same from the hopper, whereby it is believed that the work may be performed in a more efficient manner than hitherto, and without being so liable to become choked or clogged. The invention also consists in a novel arrangement of the covering shares with the seed box or hopper, whereby the shares may, when required, be readily elevated free from or out of the ground, as is necessary in turning the machine in the field, or in moving it from place to place.]

36,073.—C. M. Clark, of Cincinnati, Ohio, for Improvement in Broad-Cast Sowers :

I claim projecting the seed from the cylindrical case, B, in which the fan revolves, by means of the fan blast, in combination with the impact of the blades of the fan, substantially as described.

36,074.—C. O. Crosby and Henry Kellogg, of New Haven, Conn., for Improvement in Machine for Producing Folded Trimming :

We claim, first, The combination of delivering apparatus, substantially such as described, with apparatus for folding, substantially such as is described.

Second, We claim in combination a delivering apparatus, an assistant folder and a folding apparatus, all substantially such as specified.

Third, We claim in combination a folding apparatus, or a folding and an assistant-folding contrivance, and a mechanism for stitching folds together, the combination being substantially such as described, and operating substantially as specified.

Fourth, We claim in combination apparatus for making a fold, and apparatus for stitching, and apparatus for discharging, all substantially such as described, and operating substantially as set forth.

Fifth, We claim in combination a delivering apparatus, a folding apparatus, a stitching mechanism and a discharging apparatus, all substantially such as described, and this we claim either with or without an assistant folder, substantially such as described.

Sixth, We claim, in a folding apparatus, the use of projections at right angles to the folders or their equivalents, so that a moving-folding edge shall nip tape, braid, &c., between itself and such projections, so as to make a sharp fold, as described.

Seventh, We claim an assistant folder, having an interrupted motion, in combination with a delivering apparatus having a continuous motion, as specified.

Eighth, We claim folding blades grasping folded material, and moving at the same time and in the same direction with discharging apparatus grasping the same material, substantially as specified.

Ninth, We claim, in combination with each other, folding blades moving each over the other to form folds, which are springy or are mounted on springs, so that they may change their relative level and press upon goods when folding them, substantially as specified.

36,075.—J. E. Crowell, of Chelsea, Mass., for Improvement in Flax Cleaning and Dressing Machines :

I claim, first, The combination of the slow rollers, E E', beaters, F F', fast rollers, E2 E3, and beater, F2, with its concave, H, the whole constructed and arranged, and operated in the manner and for purpose substantially as herein described.

Second, The bladed beaters, F F', constructed as specified, and operated in pairs, in the manner described, in combination with the draw rollers, E2 E3, and beater, F2, with its concave, H, substantially as and for the purpose set forth.

Third, Delivering the cleaned and partly-dressed flax from a machine, operating substantially as described, directly upon a fixed concave, H, and under a revolving bladed beater, F, of the construction and arrangement described, substantially in the manner and for the purpose set forth.

36,076.—J. L. Crowley and L. J. Johnson, of Marion, Iowa, for Improvement in Sugar Evaporators :

We claim, first, the movable frame, E, in combination with the adjustable strainer and skimmer, F, the metallic skimmer, G, and the frame, H, operated in the manner and for the purpose herein set forth.

Second, We claim the angular flue, K, in combination with the openings, I I, and the adjustable chimney, M, for the purpose herein specified.

Third, We claim the nest of strainers, N, for the purpose herein set forth.

36,077.—Abram Davis, of Chicago, Ill., for Wind Breakers for Lanterns :

I claim, first, The wind breaker, c c c c, for the top of lanterns and lamps, made of any suitable material, by uniting the frusta of two cones, or their equivalents, which will cause currents of air to pass around the concavities, and escape at the opposite side, without disturbing or extinguishing the flame, as described.

Second, The wind breaker, h h h h, which is a band made of tin or any other suitable metal, or of glass, with a flange at its base, and set in the bottom band, below the perforations, which will turn the current of air up into the chamber above, and prevent extinguishing the flame, as described and for the purpose specified.

36,078.—Suspended.

36,079.—Suspended.

36,080.—T. H. Dunhan, of Boston, Mass., for Improvement in Machinery for Reducing Rope to Fiber :

I claim the picker cylinder, B, in combination with the toothed feed roll, F, and curved bed, G, operating substantially as described, for the purpose specified.

36,081.—J. G. Ernst, of York, Pa., for Improvement in Removable Bayonet Guard :

First, I claim the employment or use of removable guard, B, for bayonets, substantially in the manner and for the purpose shown and described.

Second, The arrangement of the adjustable elastic strap or cord, C D, and safety strap, E, in combination with the guard, B, substantially as and for the purpose specified.

Third, The arrangement of the metallic socket, b, and slotted flange, c, in combination with the elastic ball, a, strap, C D, and bayonet, A, all constructed and applied, substantially as and for the purpose set forth.

[This invention consists in the employment or use of a removable guard for bayonets, in such a manner that an ordinary bayonet may be used with or without the guard, as may be desired ; it consists further in the application to the movable guard, of a spring strap or elastic cord in combination with an adjustable safety strap, in such a manner that said guard, when applied to the point of the bayonet, is firmly and surely retained, and prevented from being displaced in practice or exercise ; it consists, finally, in the arrangement of a metallic socket, with suitable slotted flanges to receive the straps, in combination with and firmly united to an elastic ball, in such a manner that said ball can easily and firmly be lashed to the point of the bayonet.]

36,082.—Robert Fitts, Jr., of Fitchburgh, Mass., for Improvement in Machinery for Bending Wood :

I claim, first, The pattern or former, G, in connection with the chain, H, and pressure rollers, F F', constructed and arranged for joint operation, substantially as and for the purpose herein set forth.

Second, The particular manner of constructing the chain as herein shown and described, to wit : by means of links formed of a cap, f, and lining, h, riveted together, and connected by shackles, l, and sliding bars, a*.

Third, The combination of the cam, D, pressure rollers, F F', pattern and former, G, and chain, H, arranged to operate as and for the purpose specified.

[This invention consists in the employment of a chain constructed in a novel way, and used in connection with a former or pattern and pressure rollers, whereby a machine of great strength and durability is obtained for the purpose specified.]

36,083.—Philip Griffith, of Philadelphia, Pa., for Improvement in Grate Bars :

I claim a series of bars, A, each bar having a dovetailed recess, for the reception of a dovetailed projection on the adjacent bar, in combination with the block or key, E, the whole being arranged substantially as set forth, for the purpose specified.

36,084.—W. S. Hall, of Milton, Mass., for Improvement in Sewing Machines :

I claim, first, Attaching the shuttle box, K, and feeder guide, L, to the vibrating arm, G, and this I claim whether applied to a shuttle moving in the arc of a circle or to a reciprocating shuttle, substantially as described.

Second. The adjustable-reciprocating bar, N, in which is the slot, o, wherein works the pin, F, as a guide for and regulator of the feeder, M, as described.

36,085.—W. H. Harfield, of London, England, for Improved Apparatus for Working and Stoppering Chain Cables. Patented in England December 15, 1859:

First, I claim placing the Thomas Brown chain carrier, C, upon a windlass shaft, and then combining therewith and with either one of the windlass supporters, E, a curved clearing and conveying trough, J, in such a manner that the chain to be operated upon, can be taken from the hawse hole directly to and beneath the said chain carrier, and then be carried over the same to and into the aforesaid clearing and conveying through, substantially in the manner and for the purpose herein set forth.

Second, When the Thomas Brown chain carriers are placed upon a windlass shaft, I also claim arranging them with ratchet wheels and with a system of operating pawls and levers, substantially in the manner and for the purpose herein set forth.

Third, I also claim giving such a form and proportion to the Thomas Brown chain carrier as shall enable a strap and lever brake to be combined therewith, substantially as herein represented and described.

Fourth, I also claim mounting a Thomas Brown chain carrier upon a windlass shaft, when the said chain carrier is used in conjunction with the clearing and conveying trough, J, and the Thomas Brown underlifting stopper, substantially in the manner herein set forth.

Fifth, When the Thomas Brown chain carriers are arranged with ratchet wheels upon a windlass shaft, I also claim the employment in connection therewith, of the within-described arrangement of catches, which enables either of said chain carriers to be coupled with or uncoupled from the windlass shaft, substantially as herein set forth.

36,086.—W. H. Harfield, of London, England, for Improved Apparatus for Working and Stoppering Chain Cables. Patented in England May 31, 1860:

I claim communicating motion from a capstan shaft to a windlass shaft, through the medium of two Thomas Brown chain carriers, C′ and T, that are respectively mounted upon the said shafts, and the endless chain which connects the said chain carriers with each other; all substantially as herein set forth.

When motion is communicated from a capstan shaft, in the within described manner. I also claim the arranging of the other parts of my improved chain-carrying apparatus, in such a manner that one of the chain carriers, C, can be coupled with or uncoupled from the ratchet wheel, at the same time that the other chain carrier, C, can be coupled with or uncoupled from the chain carrier, C′, all substantially as herein set forth.

When motion is communicated from a capstan shaft to a windlass shaft, in the within described manner, and when the chain carriers, C C, are so arranged that they can be coupled with or uncoupled from the windlass shaft at pleasure. I also claim the combining of the strap and lever brakes, e f, with the said chain carriers, substantially in the manner and for the purpose herein set forth.

When motion is communicated from a capstan shaft to a windlass shaft, in the within described manner. I also claim combining the curved and pointed clearing and conveying troughs, J, with the chain carries, C C, and the windlass supporters, E, substantially in the manner herein set forth.

When motion is communicated from the capstan shaft to the windlass shaft, in the within described manner, I also claim arranging the ratchet wheel, D, and the counterpois pawls, c c, in such a manner with relation to the other parts of the apparatus, that a reverse movement of the windlass will be unerringly prevented by means of the constant action of two or more of the said pawls upon the teeth on the underside of the said ratchet wheel, substantially as herein set forth.

36,087.—W. H. Harfield, of London, England, for Improved Construction of Chain Windlasses and Capstans. Patented in England July 23, 1859:

I claim securing the radial flanges or stops, c c, to the sides of the annular recess in my improved chain cable working capstan or windlass, in such a manner that the said flanges can be withdrawn from their positions within the said annular recess, or be secured in any desired position within the same, for the purpose of adapting the capstan or windlass to the handling of cables of widely varying sizes, substantially as herein set forth.

36,088.—J. H. Harper, of Washington, D. C., for Improvement in Beehives:

I claim, first, The combination of the alternate comb frame, C and C′, with their upper cross pieces, d e, of unequal depth, substantially as and for the object specified.

Second, The combination of the comb frames, C or C′, with the cleat, c, cross piece, g′, notches, a′ b′, and pins, a b, all constructed and arranged as herein shown and described, and for the purposes explained.

Third, In the described combination with movable comb frames, C or C′, supported as described, I claim securing the movable honey board in position by means of pins, h, projecting into holes in the front board and door, A′, as set forth.

36,089.—Samuel Harrison, of Pottsville, Pa., for Improvement in Pumping Engines:

I claim, first, In combination with the triangular sides, A, of the frame, and the inclined cylinder, the arrangement of the steam and exhaust valves with their several operative parts, as herein described.

I also claim the arrangement of the crosshead, K, arm, Y, and the plug rod, V, with its projecting bar and roller, for operating the levers, W X, substantially as described and for the purpose set forth.

I also claim in combination with the regulating pumps, c b, the plungers, rods, arms, latches and catches for regulating the strokes of the engine, in either ascending or descending, or both, substantially as described.

I also claim in combination with a balance beam as herein represented, the connecting of the crosshead that carries the piston and the pump rod, to said beam by means of the rod, I, arranged as herein described and represented.

I also claim in combination with a single-acting pumping engine, the making of the head of the cylinder that is opposite to that one which receives the steam hollow, and connecting it directly with the boiler as contradistinguished from the jacket, by means of a steam pipe, D′, for the purpose of making the temperature of both ends uniform, as herein described and represented.

36,090.—C. T. Harvey, of Chicago, Ill., for Improvement in Charcoal Kilns:

I claim my improved or portable kiln, therefore, as made of a metallic covering arranged in convenient segments or sections for construction, or removable, substantially as described.

And in combination with the metal covering, constructed as above described, I claim the use of an interior wall or walls, C, substantially as and for the purpose described,

36,091.—J. H. Havens, of Lewiston, N. Y., for Improved Cradle Chair:

I claim the combining of a crib or cradle and sewing chair with an easy arm chair, to be used in either form separately and then to be consolidated into one chair by one move at each change. The whole so constructed and arranged as and for the purposes set forth in the above specification.

36,092.—Robert Heneage, of Buffalo, N. Y., for Improvement in Tobocco-Smoking Pipes:

I claim, in tobacco pipes, placing the opening at which the tobacco is ignited, at or near the bottom of the bowl and closing the top of the bowl with a tight cover, the whole constructed substantially as described.

36,093.—A. B. Hendyx, of Seymour, Conn., and Franklin Farrel, of Ansonia, Conn., for Improvement in Machines for Turning Irregular Forms:

We claim the rotary cutter, H, attached to the bar or lever, E, secured in the hollow shaft, C, of the driving pulleys, D, in combination with the sliding pattern, L, and sliding and rotating stock, V, arranged substantially as and for the purpose herein set forth.

We further claim the particular arrangement of the slide, N, plate, O, with the stock, V, attached, and shaft, P, together with the collar, R, wormed wheel, S, and nut, T, on shaft, P, and the sleeve, Q, attached to slide, N, with the stop, n, on the bed, A, for the purpose of admitting or producing the two movements of the support, U, as set forth.

[This invention consists in the employment or use of a rotary adjustable cutter, a sliding pattern and a movable stock or bed piece, arranged in such a manner that articles having curved surfaces in their ongitudinal profile, or straight and curved surfaces combined, may be expeditiously turned in a perfect manner.]

36,094.—E. M. Judd, of New Britain, Conn., for Improved Cord Tightener for Curtain Fixtures:

I claim the blocking piece, d, wings, e e, and roller or knob, f, formed substantially as specified, when combined with the hollow or box-shaped slide, b, as set forth.

36,095.—G. A. Keene, of Newburyport, Mass., for Improvement in Funnel Measures:

I claim a fluid measure with an opening and closing vent upon its side or bottom, and combining with said measure a tunnel rendered water tight by means of the packing, d, substantially as described and for the object specified.

36,096.—G. H. Kitchen, of New York City, for Improved Portable Apparatus for Manufacturing Illuminating Gas:

First, I claim the tile, f, formed thicker in the middle than at the ends and applied in the manner specified to equalize the heat upon the retort, as set forth.

Second, In combination with the said tile, f, I claim a double casing, a, to aid in retaining heat and equalizing the action thereof on the retort, as specified.

36,097.—Henry Loewenberg, of Boston, Mass., for Improved Fabric for Hats and Bonnets:

I claim my above-described new or improved manufacture of hat or bonnet fabric, as made of the materials and in the manner substantially as hereinbefore explained.

36,098.—C. B. Loveless, of Syracuse, N. Y., for Improvement in Grates:

I claim the cold-air registers, a a, chamber, D, vertical pipes, C, chamber, E, and hot-air register, c, in combination with the open fire-grate, B, when constructed substantially as described.

36,099.—W. H. Mallory, of New York City, for Improved Fan-Shaped Sail:

I claim, first, The truss, C, composed of the collars, a a′, socket, b, arches, c c, and plates, d d, substantially as herein set forth.

Second, The combination of the yard, B, truss, C, and swinging arms, D D, lines or chains, E F E F, and divided sail, G G, to operate substantially as and for the purpose herein specified.

36,100.—G. A. Meacham, of New York City, for Improvement in Suspender Fastenings:

I claim, first, The employment in clasps, of the buttons, B, or their equivalents, so arranged as to allow the supporting part, A, to rotate or turn relatively thereto, substantially as and for the purpose herein described.

Second, I also claim the oblong band, C, in combination with the clasp, A, substantially as and for the purpose herein set forth.

36,101.—C. C. Moore, of New York City, for Improvement in Application of Wind Power to Produce a Reciprocating Movement:

I claim the combination and arrangement with a wind wheel, F, of the double crank shaft, G, cap, C, shaft, A, pitmen, e e, slide, H, and band, I, with rods, i i, attached as and for the purpose herein set forth.

36,102.—O. F. Morrill, of Chelsea, Mass, for Improved Apparatus for Gasifying and Burning Carbon Oils:

I claim the arrangement of the receiving mouths of the conduit, D, above the lower part of the interior of the vaporizer, as described.

I also claim the extension of the conduit, D, as set forth, into the vaporizer, B, and across and over the burner or part, E, thereof, substantially as and for the purpose set forth.

I also claim the screw cap, G, as constructed with the central core or projection, d, and the annular recess, e, arranged within it and to receive the washer when placed within the screw of the cap, as set forth.

36,103.—Don J. Mozart, of New York City, for Improvement in Clock and Watch Movements:

I claim the construction and arrangement of the mainspring, A, with two springs, or coils, each furnishing the only fixed attachment for the other, in combination with two driving wheels, B B, acting on opposite sides of a common pinion, b, substantially as and for the purpose herein specified.

In combination with the above I also claim the combined arrangement of the successive wheels and pinions, B b C c and D d, so that the respective pairs shall directly produce the main divisions of time in connection with suitable dial plates, substantially as and for the purpose herein set forth.

In combination with the subject matter of the first clause of the claim, I also claim the construction and arrangement of the escapement, substantially as and for the purpose herein specified.

36,104.—William Osmond, of New York City, for Improvement in Sand Screens:

I claim a sand screen having its wires, d′, secured to its cross rods, c, by twisting the former around the latter, and either with or without the rings or collars, f, interposed between the wires, substantially as described.

[This invention consists in attaching the wires to the screen in such a manner that they will be retained much more firmly in position than those attached in the usual way, and also form a stronger and more durable screen, one that will not be injured by the scraping of the spade over it, a means usually employed by workmen to clean the screen when choked by gravel, the wires also being capable of resisting the action of the spade so as not to become bent or injured by its action.]

36,105.—G. B. Owen, of New York City, for Improvement in Clock Cases:

I claim, first, A clock case constructed of a single piece of sheet metal, and having its extremity turned over and inward at the front end, when said case thus formed is used in connection with the dial, C, placed within the case, as and for the purpose set forth.

Second, I claim the flange, D, spun or struck up at the back part of the case, A, in combination with the recess, a, and flanch, b, at the front part of the case, all formed of a single piece of metal, as and for the purpose specified.

Third, Connecting the sash, B, directly to the case, A, by means of the hinge, F, formed of a metal strap, e, passing around a wire, f, attached to the sash and through a slot, g, in the case, to the inner side of which it is secured; but this I only claim when the hinge is used with a case, A, constructed as herein described.

36,106.—J. M. Perkins, of Cleveland, Ohio, for Improvement in Locks:

I claim placing the keyholes on opposite sides of the lock, at unequal distances from the bolt, in combination with the bolt and guard, constructed and arranged substantially as and for the purpose set forth.

36,107.—Enock Piper, of Camden, Maine, for Improvement in Apparatus for Preserving Animal and Vegetable Substances:

I claim, first, The employment in refrigeratory apparatus of the removable receiving and distributing pan, D, in combination with the series of descending tubes, B, and suitable means of continuously draining the same, substantially as and for the purpose herein described.

Second, I also claim the tapering form of the descending tubes, B, arranged to operate in combination with a receiving and distributing pan, D, and a cooling chamber, M, substantially as and for the purpose specified.

Third, I also claim in refrigeratory apparatus the [arrangement of the open ascending drain tube, F, relatively to the tubes, C and B, in the manner and for the purpose herein set forth.

36,108.—Suspended.

36,109.—J. C. Raymond, of Brooklyn, N. Y., for Improved Rudder:

I claim the construction of the rudder blade of two parts, B C, one of which is capable of being drawn into the other in such a manner as to allow the blade to pass through an ordinary rudder port, substantially as and for the purpose herein specified.

And I also claim combining the inner portion, C, of the blade with the outer portion, B, and with the stem and head by means of oblique slots, g g, pins, b b, and a rod, D, passing upward through the stem and head, substantially as herein specified.

36,110.—C. M. Roullier, of Paris, France, for Improvement in Driving Bands for Machinery:

I claim, as a new manufacture, the production of articulated cables, bands or belts, for driving machinery or for other purposes, by utilizing waste cuttings of leather and forming such cuttings into links which being mounted upon spindles, whether combined or not with metallic links, constitute a cable or band capable of adjustment in length and width without seam or ridge, substantially as herein set forth.

36,111.—William Sellers, of Philadelphia, Pa., for Improvement in Tool Holders for Turning Lathes:

I claim the construction of a slide rest for lathes wherein the cutting tool, in addition to the usual movements in a horizontal plane, has also a vertical adjustment, when this adjustment is made about a fixed center placed between the cutting point and the adjusting screw, substantially as described and for the purpose specified.

I also claim the described method of forming a hinged joint for the purpose of giving vertical adjustment to the turning tool, by the employment of a block, H, and pin, G, when constructed and arranged in connection with the other parts of the rest, substantially as and for the purpose described.

36,112.—William Sellers, of Philadelphia, Pa., for Improvement in Boring Mills for Metals:

I claim, first, The described construction of a boring mill for metal, in which the boring bar is actuated and held in position laterally by a vertical slide placed beneath the table or face plate of the machine, the whole being constructed and operating substantially in the manner and for the purpose specified.

Second, The employment in combination with the table, B, of a ring, P, or its equivalent, when arranged and operating substantially in the manner and for the purpose set forth.

36,113.—William Sellers, of Philadelphia, Pa., for Improvement in Metal Planing Machines:

I claim the use of cogged gearing for planing machines, wherein one or the series of cogs have their contact surfaces formed by straight lines in the direction of their width, whilst the other series have their contact surfaces arranged spirally about an axis which is placed at an angle to the line of motion of the first series.

36,114.—Edward Spencer, of St. Louis, Mo., for Improvement in Hand Stamps:

I claim the combination of the die, B, the rollers, c, and ribbon, h, with a pair of squeezers, made substantially in the manner shown and described.

36,115.—Enoch Stewart, of Battle Creek, Mich., for Improvement in Current Water Wheels:

I claim a current wheel, B, placed on a horizontal shaft, A, and provided with buckets, d, attached to its rims, a a, in a radial position by means of hinges and joints, e, and used in connection with the pins or stops, h, all arranged to operate substantially as set forth.

[This invention relates to that class of water wheels termed current wheels. Its object is to obtain a simple and durable wheel and which will operate without having its buckets subjected to much wear and tear, as is the case with all of these wheels in which the current or force of the stream is made to adjust or operate the buckets.]

36,116.—B. F. Sturtevant, of Boston, Mass., for Improvement in Projectiles for Rifled Ordnance:

I claim, in combination with the annular neck groove, b, and the part of the expansive packing to enter the same, the annular enlargement or crossing groove, a, and the metallic head or filling thereof.

I also claim the arrangement of the two series of interlocking teeth with respect to the annular packing and its holding grooves.

36,117.—Alonzo Templeton, of Chicago, Ill., for Improved Shallow Water Boat:

I claim, first, The endless flexible band, H, having the form of a shallow boat bottom and armed with floats, d, in combination with the endless jointed track, F, propelling wheels, D D′, and trucks or supporting wheels, C C, when the whole is constructed and arranged in the manner and for the purposes described, and in combination with the preceding, and the like land and marine boat, the compound rudder, hereinbefore described, consisting of posts, e e′, wings, f f′, and rocking lever, K, when combined and arranged to operate in the manner and for the purpose specified.

36,118.—C. J. E. Thompson, Providence, R. I., for Improvement in Adjustable Links:

I claim having the link made in two equal parts, A, the faces of which are provided with openings, b, and projections, a, which fit and operate together in the manner herein shown and described.

[The object of this invention is to obtain a link which may be immediately applied to a chain as a substitute for a broken link, or be used to connect any detached parts which are or may be connected by a link and which may break or casually give way.]

36,119.—Adam Weber, of New York City, for Improvement in Setting Gas Retorts:

I claim the herein described arrangement of setting clay retorts upon separate girders, said girders being supported by an arch or arches built over the fireplace, and arranged in the manner and for the purpose substantially as set forth.

36,120.—W. H. White, of Dubuque, Iowa, for Improvement in Cutters for Sugar Cane, &c.:

I claim, first, The combination of the two semicircular knives and the cycle-shaped knife, as seen at figures 2 and 3, and placed in the frame, as described, any two circular knives, whether made into one or more pieces of steel and held together by springs.

Second, I claim the semicircular knives, as shown in figures 1 and 2, and letters, a e p, and the incircling of the cane with sharp edges, for the use and purposes herein described.

Third, I claim the mode of fastening the shank, S H, into the socket ferrule, as seen in figure 4, and letters, G and S, and the dotted lines.

Fourth, I claim the combination of the frame as seen at figures 3 and 6, and operated as above specified and for the purposes set forth.

36,121.—Bernard Wise, of Cincinnati, Ohio, for Improvement in Housing and Shipping Ice:

I claim, first, The arrangement of inclined and adjustable causeways, C C′, endless carriers, E F G, and rollers, H, the whole being combined and operating together, substantially as set forth.

Second, In the described connection with the adjustable causeway, C, I claim the hinged and self-adjusting discharging chute, J K, operating as set forth.

36,122.—Lorenz Wolf, of St. Louis, Mo., for Improvement in Plows:

I claim, first, The iron box, F, placed under the beam with the arrangement of the plate, c, the lug, e, and the screw, G, working in the box, in connection with the standard, D, the plowbeam and plowshare or its equivalent, substantially in the manner described and for the purpose specified.

Second, I claim providing the front end of the land side of the plow with a recess for the reception of the detachable sod cutter, J, and also providing attachable block, J′, to fill said recess when the sod cutter is detached, the whole to be constructed and arranged as and for the purpose set forth.

36,123.—James Fenning (assignor to himself and James S. Taylor), of Danbury, Conn., for Improved Coasting Guard for Boots and Shoes:

I claim the use of adjustable metallic tips and heels, for the protection of boots and shoes, when constructed and operating in the manner and for the purposes herein specified.

36,124.—T. G. Harold, of Brooklyn, N. Y., assignor to himself and Charles Perley, of New York City, for Improvement in Locks:

I claim, first, Uniting and retaining the external plates, a and d′, of the lock together by means of the flanges, b and c, screw threaded, or with lugs formed thereon as described, and hasp, e, substantially as set forth.

Second, Two or more circular tumblers with turned-up flanges, placed one within the other, and each connected with a separate dial or pointer, in combination with the lock case, constructed as above set forth.

Third, In combination with circular tumblers with turned-up flanges and hasp, e, formed as described, I claim the decoy notches and teeth formed on the inner side of the said flanges, for the purposes specified.

36,125.—Elizabeth Higgins (assignor to Henry Higgins), of Boston, Mass., for Dress Protector:

I claim as a new article of manufacture the dress-protecting breeches constructed as described.

36,126.—John A. Preston (assignor to the New England Glass Company), of Boston, Mass., for Improved Bottle Stopper:

I claim the glass stopper, B, in combination with the glass ball or valve, C, secured thereto by the wire, d, or its equivalent, a chain or thread attached at e to the ball, and connected at its lower end to a

wire or cross brace which prevents the ball from falling entirely out from the stopper, substantially as specified.

36,127.—J. M. Stiven (assignor to himself, Michael Toomey and John Elder, Jr.), of New York City, for Improvement in Air Valves for Steam Apparatus :

I claim cylinder valve, f, in combination with the pipe, c, and seat, e, as and for the purposes specified.

36,128.—J. M. Stiven (assignor to himself, Michael Toomey and John Elder, Jr.), of New York City, for Improvement in Fire-Regulators for Steam Boilers :

I claim the cylinder, d, piston, f, and chamber, b, or its equivalent, in combination with the lever, k, and a communication to the dampers or doors employed in steam apparatus for regulating the draft of air according to the pressure of water in the cylinder, d, as set forth.

I also claim the screw, p, spring, l, and index in combination with the cylinder, d, piston, f, rod, g, and lever, k, for the purposes and as set forth.

36,129.—John Hatcher (assignor to himself and George Lyon), of Brooklyn, Ohio, for Improved Washing Machine :

I claim the adjustable rubbers, D D, the springs, F, and adjusting screws, E, in combination with the fluted roller, C, portable frame, A, and hooks, B, arranged and operating as and for the purpose specified

36,130.—W. H. Van Nortwick (assignor to himself and R. S. Van Rensselaer), of Bordentown, N. J., for Improved Reclining Chair :

I claim, first, So hinging the front of the seat and the lower end of the back to the legs, or to any substitutes for the same, that on lowering the seat, the back will be lengthened, and on raising the seat the back will be shortened, as set forth.

Second, In combination with the back and seat hinged to the legs or their substitutes, as set forth, I claim the arms, F and G, and rods, H H, or their equivalence, whereby the movement of the back and that of the seat are rendered simultaneous and dependent on each other.

Third, I claim the self-locking device, composed of the rods, M and M', lever, L, and spring, N, or their equivalents, when applied to and combined with the hinged seat, D, and arms, G, substantially as specified.

36,131.—William Zettle (assignor to himself and John H. Stallo), of Cincinnati, Ohio, for Improved Jar for Provisions, &c. :

I claim the combination of cover C, having the boss, E, inclined planes, F, and studs, G, with the binding and locking clamp, H I I J, for application to a rimmed jar, or like vessel, in the manner set forth,

Second, The construction of the cover, C, with wedge-shaped projections, F F, in combination with the clamp, H, and the neck of the jar, as shown and described.

DESIGNS.

1,614.—Wm. H. Green and P. J. Clark (assignor to S. S. Clark), of West Meriden, Conn., for Design for a Lamp Bracket.

1,615.—S. A. Holmes, of Brooklyn, N. Y., for Design for a Photographic Background.

1,616.—James Hutchison (assignor to J. E. Whipple), of Lansingburgh, N. Y., for Design for a Floor Cloth Pattern.

1,617.—W. W. Lyman, of West Meriden, Conn., for Design for a Fruit Can.

1,618 and 1,619.—E. J. Ney, of Lowell, Mass., assignor to the Lowell Manufacturing Company, for two Designs for Carpet Patterns.

1,620 and 1,621.—W. W. Roberts, of Hartford, Conn., for two Designs for a Burial Case.

1,622.—Garrettson Smith and Henry Brown (assignor to Cox, Whiteman and Cox), of Philadelphia, Pa., for Design for the Plates of a Cook's Stove.

1,623.—Russel Wheeler and S. A. Bailey, of Utica, N. Y., for Design for a Stove.

Books and Publications Received.

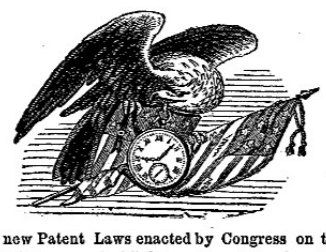
TRAIN'S UNION SPEECHES. By George Francis Train, Esq., of Boston, Mass. Price 25 cents a copy, or five copies for one dollar, and is published and for sale by T. B. Peterson & Bros., 306 Chestnut st., Philadelphia, Pa.:

This work contains all the speeches delivered by George Francis Train in England, up to the present time, since the publication of the first volume of his Union Speeches. It is complete in one large octavo volume, printed in the best style.

BLACKWOOD'S MAGAZINE. Published by Leonard, Scott & Co., New York City :

The last-issued number of this magazine is the first of a new volume, and the period to renew subscriptions. It contains contributions from Bulwer and George Elliott, and is undoubtedly the best European monthly in the English language. Its essays on scientific subjects are usually of a very superior cast, and its tales are unrivaled.

PATENTS FOR SEVENTEEN YEARS.



The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention (if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remi money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchauts on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The goverument fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

Notes and Queries

L. G., of Ind.—The incrustation of boilers is formed of various substances, but generally to a considerable extent of the carbonate of lime, especially in your region. We know of nothing better than a little sawdust to prevent the deposit.

M. S. O., of Mass.—Thirty gallons of water weighs 240 pounds, and this weight falling 6 feet produces 1440 foot-pounds of power. This is sufficient to raise 72 pounds 20 feet high provided there was no loss from friction or other resistances. The only experiment to test the power of a hydraulic ram, of which we can find an account, gave a yield of about 43 per cent of the total power. From this, your ram should raise about 31 pounds 20 feet high, say 4 gallons per minute.

H. A. W., of Mich.—Scratches in a looking-glass can only be removed by grinding and polishing the surface.

H. J. B., of Pa.—We think your revolving fire arm is new and patentable. We know of nothing that it would infringe upon, as far as you have described it.

H. B., of Pa.—We do not know of any manufacturers of rotary pumps on so small a scale as you require. Messrs. W. D. Andrews & Co. and W. H. Carey, both of this city, manufacture rotary pumps. You might address them.

B. F. G., of Ky.—We advise you to consult Dr. J. H. Clarke, office No. 198 Tenth street, New York, in regard to your malady, or send to him for a copy of his work on the Eye and Ear.

J. C. J., of Mass.—Your proposed river rams, with rafts fastened to their sides, would be very difficult to manage. A ram should have as good a form for sailing fast and turning as any other steamer, and unless it has a high speed it will be almost useless.

S. D. J., of Ohio.—The egg-hatching machine to which you refer, was not illustrated. It was maintained at a temperature of about 100° Fah. with warm water.

S. C., of C. W.—Brass philosophical instruments are easily tarnished, and this cannot be prevented but by gilding, which would render them too expensive. Brass may be bronzed by the use of nitric acid and the nitrate of silver. It may also be lacquered with a varnish; but such applications would not suit your purpose. Sperm oil is the best lubricating agent for brass working in brass; a mixture of refined petrolium and castor oil is also a good lubricator for brass bearings.

W. B., of Conn.—Copal varnish is about the best which you can use for japanning your tin articles, because it is tough when dry, and not so easily scratched as varnish made with resin dissolved in alcohol. A transparent japan varnish may be made with camphor and copal in equal quantities dissolved in equal parts of turpentine and oil of lavender.

R. L. L., of Mass.—Wool can be reduced into a paste resembling glue, by submitting it for several hours in a close vessel, to the action of high pressure steam. Bones can also be dissolved in the same manner. Water of an elevated temperature is one of the most powerful solvents.

H. T. J., of Maine.—The famous Greek fire is supposed to have been made with asphaltum in powder, mixed with saltpeter and sulphur.

J. W. W., of Ohio.—The part of a carriage wheel that is rising moves faster than the part that is going down.

J. McA., of N. Y.—Your blue cloth sack which has been stained with urine, cannot be restored to its original color, but by the application of a coloring agent, and you should apply to a dyer to perform the operation. Grease spots may be removed from light silk by placing soapstone dust upon the spots, then overlaying it with a sheet of blotting paper and placing a warm flat iron on the top of all. Allow the latter to remain on the paper above the grease spots until it becomes cool, then remove it and examine the silk. If you find the soapstone dust adhering to the silk by sticking to the spots, it is a sign that the grease has not all been absorbed by the dust. You must therefore repeat the operation until the dust ceases adhering to the spots. This is a simple and safe, though rather a slow process. Grease can also be removed from light-colored silk with alcohol, benzole, a mixture of camphene and alcohol ; also with the bisulphide of carbon, but as the fabric requires to be made wet by the employment of any of these liquids, it must be dressed afterward to restore the luster of its surface. Grease may be removed from silk ribbons by rubbing them with a clean sponge dipped in alcohol, and if dressed with care on the wrong side with a warm flat iron, they will look almost as well as new ribbons.

N. W. Z., of Pa.—We have no record of the best time made by screw steamers on smooth and rough water. The *Warrior* screw frigate, has run at the rate of nearly seventeen miles per hour in smooth water. Even though we or you had such data it would be of no scientific value without a knowledge of the form of the vessel, its submerged midship section, its size, the power of the engines, the character of her boilers and the amount of fuel consumed per hour.

Money Received

At the Scientific American Office on account of Patent Office business, from Wednesday, Aug. 6, to Wednesday, Aug. 13.

Persons having remitted money to this office will please to examine this list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

A. Y., of Ohio, $15; O. R. B., of N. Y., $15; R. J. A., of Mich., $25; R. D. M., of N. H., $25; S. F. E., of Ohio, $25; P. & T., of Pa., $15; F. W. H., of Mass., $25; H. & R., of N. Y., $15; S. E. P., of N. H., $25; H. & S., of Mass., $25; W. T. S., of Mo., $25; P. M., of N. Y., $5; H. & K., of N. Y., $15; T. S., of Ky., $15; J. C. McK., of Ill., $25; H. H. C., of N. Y., $25; J. P., of N. Y., $15; H. T., of Ind., $25; C. S. D., of N. Y., $15; E. H. S., of Pa., $7; O. S., Jr., of Canada, $15; S. K. S., of N. Y., $10; C. S. D., of N. Y., $15; S. N. T., of N. Y., $15; L. P. H., of Iowa, $15; J. P., of N. Y., $15; S. F., of Ohio, $25; G. T. P., of N. Y., $25; R. H., of N. J., $15; J. B., of Ind., $15; B. & C. F., of Iowa, $25; G. G. P., of N. Y., $25; R. & G., of Pa., $25; J. F. G., of N. Y., $25; A. O. C., of N. J., $25; H. V. F., of Ind., $20; R. R., of N. Y., $40; J. F. T., of Mass., $20; P. A. S., of N. Y., $20; C. F. B., of R. I., $20; A. C. G., of N. Y., $20; S. M., of Conn., $20; Wm. L., of Iowa, $20; H. S., of Canada, $45; W. O. F., of N. Y., $20; A. S., of N. Y., $20; T. & R., of Ind., $20; A. D. S., of Me., $20; E. H. C., of N. Y., $20; A. D., of N. Y., $20; J. K. H., of Ind., $20; J. H. C., of Va., $20; G. W. B., of N. Y., $35; J. C. B., of Wis., $15.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from August 6 to Wednesday, August 13, 1862 :—

R. & G., of N. Y.; G. P., of N. Y.; B. & C. F., of Iowa; E. H. S., Pa.; S. F., of Ohio; H. T., of Ind.; R. & G., of N. Y.; B. & R., of Mass. (2 cases); S. F. E., of Ohio; A. F., of N. Y.; E. D. M., of N. H. F. H. G., of N. Y.; F. W. H., of Mass.; S. E. P., of N. H.; H. & S of Mass.; W. T. S., of Mo.; R. J. A., of Mich.; J. C. McK., of Ill.; H H. C., of N. Y.; C. C. W., of Ill.; D. W. H., of Cal.; A. O. C., of N J.; R. R., of Pa.; H. C., of N. J.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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VOLUMES I., II., III., IV., V., VI. (NEW SERIES) COMPLETE (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1 50 per volume, by mail, $2—which include postage. Price, in sheets, $1. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Numbers 3, 4, 6, 8, 9, 10, 11, 12 and 16, of Vol. VI. are out of print and cannot be supplied.

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INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—
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A. C. CHAMBERLAIN'S PATENT MOSS BASKETS for growing all kinds of choice Plants, Fruits and Flowers. See engraving, SCIENTIFIC AMERICAN, Vol. V. (new series), page 343. This invention is the wonder of the age. Nothing can approach it in the health and vigor it imparts to the plants. Prices No. 1—for grapevines $3; No. 2—for peach trees and other fruits $2 50; No. 3 and 4—for flowers $1 25 and $1. The vitadoram, a preparation for the plants $1 per canister. Full directions with each basket. Remit to A. C. CHAMBERLAIN, corner De Kalb avenue and Ryerson street, Brooklyn, or C. B. MILLER, his agent, 634 Broadway, N. Y. 8 2*

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RENSSELAER POLYTECHNIC INSTITUTE, TROY, N. Y.—The thirty-ninth Annual Session of this Institution for instruction in the Mathematical, Physical and Natural Sciences, will commence on Wednesday, Sept. 17, 1862. Appropriate quarters, and a full supply of apparatus, will be provided, so that all the Courses of Instruction can be given precisely as heretofore. The new buildings for the Institute will be placed on a more commanding site, and be constructed as soon as possible.
The Annual Register, containing full information, can be obtained from Prof. CHARLES DROWNE, Director. 6 6

THE CRAIG MICROSCOPE—PATENTED FEBRUARY 18, 1862, magnifying 100 diameters or 10,000 times, yet so simple that a child can use it. Sent by mail, postage paid, on receipt of $2 25. Liberal discount to the trade. Address HENRY CRAIG, 182 Centre street, New York City. Eight mounted objects will be sent for $1. 8 5

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TO PHOTOGRAPHERS.—IMPROVED PHOTOGRAPHIC Camera, Patented March 25, 1862, by A. B. WILSON (Patentee of the Wheeler and Wilson Sewing Machine), adapted to all photographic work; such as Landscapes, Stereoscopic Views, Carte Visites, Ambrotypes, &c. Can be used by amateurs and others from printed directions. Send for a circular. Address A. B. WILSON, Waterbury, Conn. 1tf

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FULTON'S COMPOUND, FOR CLEANSING STEAM boilers of scale.—This article is powerful to remove scale, and will not injure the boiler. Western agents, WALWORTH, HUBBARD & CO., Chicago, Ill. Sole proprietor, E. H. ASHCROFT, No. 82 Sudbury street, Boston, Mass. 9 tf

GUILD & GARRISON'S CELEBRATED STEAM Pumps—Adapted to every variety of pumping. The principal styles are the Direct Action Excelsior Steam Pump, the improved Balance Wheel Pump, Duplex Vacuum and Steam Pumps, and the Water Propeller, an entirely new invention for pumping large quantities at a high lift. Also one 50-horse steam engine, good as new, will be sold cheap. For sale at Nos. 55 and 57 First street, Williamsburgh, and No. 74 Beekman street, New York.
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QUARTZ MILLS OF THE MOST APPROVED KIND. Manufactured by BURDON, HUBBARD & CO., 102 Front street, Brooklyn, N. Y. Also agents and manufacturers of the Russ Patent Premium Amalgamators, the best and simplest in use for saving both fine and coarse gold. 1 13

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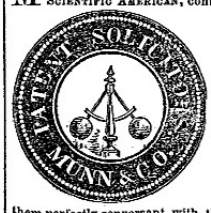

Consultation may be had with the firm between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Offices are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London 29 Boulevard, St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

A pamphlet of information concerning the proper course to be pursued in obtaining Patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office, or either of the Branches. They also furnish a Circular of information about Foreign Patents.

The annexed letters from former Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that while I held the office of Commissioner of Patents MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE came through your hands. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly, CHAS MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster General of the United States, he addressed to us the abjoined very grateful testimonial:—

MESSRS. MUNN & CO.:—It affords me much pleasure to be testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

MESSRS. MUNN & CO.—*Gentlemen:* It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your Agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, WM. D. BISHOP.

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PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 5 3m

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten anzeigt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an
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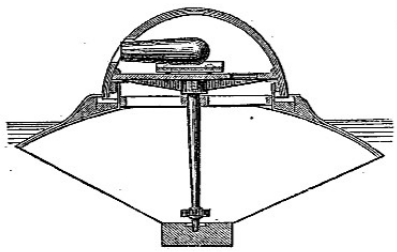
Preis 20 Cts., per Post 25 Cts.

Who Originated the Monitor?

It has been asserted in the British Parliament, by Lord Palmerston and others, that Capt. Ericsson procured his idea of the *Monitor* from Capt. Coles, of the British navy.

The following is Capt. Coles's claim. He states in a letter to *The Times* of April 5, 1862, that his experience in the Baltic and Black Seas, in 1855, suggested to him the idea of building impregnable vessels, and that toward the latter part of that year he had "a rough model made by the carpenter of the Stromboli," and that he proposed to protect the guns by a stationary shield or cupola. Capt. Coles, it appears, met with no encouragement from the Admiralty, and therefore consulted Mr. Brunel, the celebrated engineer, who warmly embraced the plan. "He did more," says Capt. Coles in his letter to *The Times;* "he assisted me in my calculations, and gave me the aid of his draughtsmen." Capt. Coles further states that, notwithstanding official neglect, he persevered, and in March, 1859, produced drawings of a "shield fitted with turn tables." Lastly, in December, 1860, Capt. Coles published, in *Blackwood's Magazine*, drawings of his "gun shield and revolving platform," the platform being turned by manual power only.



To the charge of having stolen his plan from Capt. Coles, Capt. Ericsson replies that the following is an extract of a communication forwarded from the City of New York, to Emperor Napoleon III, at Paris, by J. Ericsson, on the 26th of September, 1854, accompanied by drawings, of which the annexed engravings are *fac similes*. The receipt of the said communication was at once acknowledged by His Majesty:—

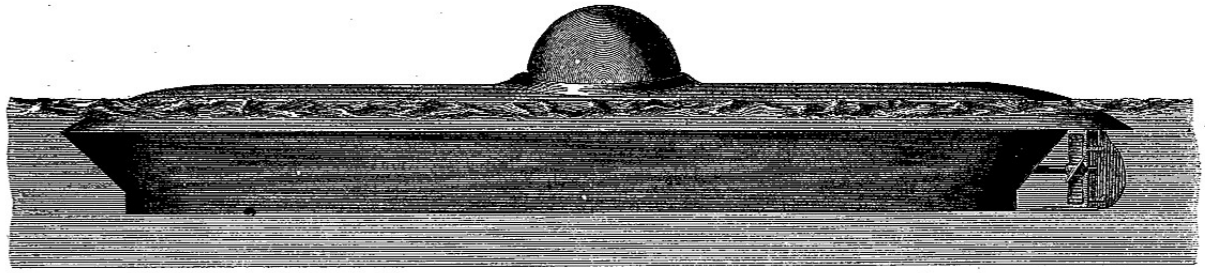
NEW SYSTEM OF NAVAL ATTACK.—The vessel to be composed entirely of iron. The midship section is triangular, with a broad, hollow keel, loaded to balance the heavy upper works. The ends of the vessel are moderately sharp. The deck, made of plate iron, is curved both longitudinally and transversely with a spring of 5 feet; it is made to project 8 feet over the rudder and propeller. The entire deck is covered with a lining of sheet iron, 3 inches thick, with an opening in the center 16 feet diameter. This opening is covered by a semi-globular turret of plate iron, 6 inches thick, revolving on a column and pivot, by means of steam power and appropriate gear work. The vessel is propelled by a powerful steam engine and screw propeller. Air for the combustion in the boilers, and for ventilation within the vessel, is supplied by a large self-acting centrifugal blower, the fresh air being drawn in through numerous small holes in the turret. The products of the combustion, and impure air from the vessel, is forced out through conductors leading to a cluster of small holes in the deck and turret. Surrounding objects are viewed through small holes at appropriate places. Reflecting telescopes, capable of being protruded or withdrawn at pleasure, also afford a distinct view of surrounding objects. The rudder stock passes through a water-tight stuffing box, so as to admit of the helm being worked within the vessel. Shot striking the deck are deflected, whilst shell exploding on it will prove harmless. Shot (of cast iron) striking the globular turret will crumble to pieces or are deflected. This new system of naval attack will place an entire fleet of sailing ships, during calms and light winds, at the mercy of a single craft. "Boarding," as a means of defence, will be impracticable, since the turret guns, which turn like the spokes in a wheel, commanding every point of the compass at once, may keep off and destroy any number of boats by firing slugs and combustibles.

A fleet at anchor might be fired and put in a sinking condition before enabled to get un der way.

Of what avail would be the "steam guard ships" if attacked on the new system? Alas for the "wooden walls" that formerly "ruled the waves!"

The long-range Lancaster gun would scarcely hit the revolving iron turret once in six hours, and then, six chances to one, its shot or shell would be deflected by the varying angles of the face of the impregnable globe. When ultimately struck at right angles, the globe, which weighs upward of 40 tuns, will be less affected by the shock than a heavy anvil by the blow of a light hammer; consequently, the shot would crumble to pieces, whilst the shell would strew the arched deck with harmless fragments.

During contest the revolving turret should be kept in motion, the port holes being turned away from the opponent except at the moment of discharge, which, however should be made during full rotation, as the lateral aim in close quarters requires but little precision.



THE MONITOR AS FIRST PROJECTED.

VALUABLE RECEIPTS.

POMATUM FOR GROWTH OF THE HAIR.—This pomatum, applied to the scalp, acts as a stimulant to the roots of the hair, and as a nourisher to the hair itself, by stimulating the capillary vessels. In the immediate neighborhood of hair-bulb, the blood particles are more numerous and active. The ammonia, containing as it does nitrogen, one of the principal constituents of hair, horn and nail, affords one of its direct elements of formation, and hence its value as a nourisher. It is utterly impossible for the animal economy to create hair out of any oil, because oil is destitute of nitrogen, but if grease be combined with ammonia, which yields nitrogen, then great benefit will be derived from the pomade so made. All pomades and oils that are used for the hair only act as a polish, but afford no nourishment. The following is a simple form for making the ammoniacal pomatum:—Take almond oil, a quarter of a pound; white wax, half an ounce; clarified lard, three ounces; liquid ammonia, a quarter fluid ounce; otto lavender and cloves, of each one drachm. Place the oil, wax, and lard into a jar, which set into boiling water; when the wax is melted, allow the grease to cool till nearly ready to set, then stir in the ammonia and the perfume, and put into small jars for use. Never use a hard brush, nor comb the hair too much; apply the pomade at night only.—*Septimus Piesse.*

BLACKBERRY CORDIAL.—To one quart of blackberry juice, add one pound of white sugar, one table spoonful of cloves, one of allspice, one of cinnamon, and one of nutmeg. Boil all together fifteen minutes—add a wineglass of whiskey, brandy or rum. Bottle while hot, cork tight and seal. This is almost a specific in diarrhea. One dose is a wineglassful for an adult—half that quantity for a child—will often cure diarrhea. It can be taken three or four times a day if the case is severe.

BLACKBERRY WINE.—To make a wine equal in value to port, take ripe blackberries, press the juice from them, let it stand 36 hours to ferment (lightly covered) and skim off whatever rises to the top; then, to every gallon of the juice add one quart of water and 3 lbs. of sugar (brown will do), let it stand in an open vessel for 24 hours; skim and strain it, then barrel it. Let it stand 8 or 9 months, when it should be racked off, and bottled, and corked close. It improves by age.

LIME WATER FOR PAPER RAGS.—In boiling colored rags in the close keers of paper mills, prior to bleaching them, they are subjected to the action of caustic lime in powder mixed with water. The solid particles of the lime adhere to the rags after they are removed from the keer, and washing in water removes them with difficulty. Paper makers should use clear lime water in their keers, instead of lime in powder. It is made by mixing slacked lime in cold water in a vat, agitating it with a rake and allowing it to settle for a few minutes.

BABBITT'S METAL.—This alloy which is so much used for the bearings of shafts and axles is composed of copper 24 parts by weight, Banca tin 24 parts and antimony 8. These metals are melted together and run into ingots, which are kept on hand for making the castings.

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